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Agricultural Research Service
Northeastern Region
Plant Genetics and Germplasm Institute
Vegetable Laboratory
Beltsville, Maryland

THE POTATO-BREEDING PROGRAM, USA, 1974

By
Raymon E. Webb and Others
and
State Cooperators

(Forty-fifth Annual Report by Cooperators)
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BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC) (BELTSVILLE, MARYLAND)
AND CHAPMAN AND AROOSTOOK FARMS (PRESQUE ISLE, MAINE)

R. E. Webb (BARC), David R. Wilson (Presque Isle, Me.) and James Frank (Orono, Me.)

BARC

Breeding, evaluation. One hundred eighteen parents selected for their pest-resistance, high quality, adaptability and skin type were grown in the greenhouse. Five hundred and seventeen seed lines were obtained through selective matings. Two hundred and ninety-nine seed lines were selected for seedling production in the greenhouse. Approximately 50,000 "A" size seedling tubers were produced for distribution to cooperators. Approximately 275 clones each were evaluated for resistance to viruses A, X and Y following the harvest of the potato seedling tubers.

Distribution of Materials. Distribution of true seed, seedling tubers, advanced selections and named varieties continued in 1974. A summary of the shipments are given in Tables 1, 2 and 3.

PRESQUE ISLE

Planting began about 3 weeks late (May 29-30) due to excessive rainfall early in the season and persistence of deep soil frost in some areas. The growing season approached the ideal in adequacy of moisture and optimum temperatures (Table 4). Fall frosts did not interfere with an adequate growing season for the medium and late maturing trials. Yields in general were well above those of the dry 1973 season and somewhat above the 5-year average.

CHAPMAN FARM

Approximately 43,000 seedlings representing 299 parental combinations from Beltsville were planted on Chapman Farm. From these approximately 1551 selections were made for observation in 12-hill lots in 1975. Parental combinations included immunity to virus Y originating from Solanum stoloniferum, frost resistance from S. acaule and processing potential direct from 40° F storage from S. chacoense and S. phureja. Sixteen hundred and twelve selections were grown in 12-hill lots during 1974 for preliminary evaluation for tuber type, productivity and specific gravity. Two hundred and twelve selections from the 1973 12-hill lots were increased for distribution to cooperators, included in preliminary yield trials and evaluated for processing quality. Most of these were included in the four or more of the disease evaluation trials conducted on Aroostook Farm and the three done at BARC. Approximately 400 additional clones were increased for trial by cooperators, used as parental stocks and as foundation seed for yield and other trials conducted at Aroostook Farm and BARC.

AROOSTOOK FARM

Experimental design for all yield tests was a randomized block with four replications. All plots received 800 pounds of 15-15-15 fertilizer banded in 36-inch rows by a two-row planter. Clones to be tested were hand planted in 25-hill rows with 9-inch spacing. A 14-inch seed spacing was used in the russet yield trials. Cultural methods and materials for weed, insect, and disease control were according to local recommendations. Rainfall and temperature during the season are given in Table 4. At harvest all entries were graded and samples hand selected for specific gravity and quality evaluations.

Specific gravity was determined by the air and water method. After specific gravities were determined, the samples were divided and placed in 50° F and 40° F storage at 90 percent relative humidity.

Samples were fried after 4 months of storage. One set of samples from the advanced yield trials stored at 40° F were reconditioned for three weeks prior to frying. Potato chips were made from each sample by cutting the tubers in half and taking a 1/16-inch thick slice from each tuber with a rotary food slicer. Slices were rinsed in water and placed on paper towels to remove excess water. Chips were then fried at 340° F in Primex vegetable shortening until bubbling ceased.

A french fry plug 3/8-inch in diameter was cut from each half of the tubers in the sample. After plugs were trimmed, rinsed, and excess water removed, they were fried at 365° F in Primex shortening for 5 minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1 = very light to 10 = very dark. French fry classes ranged from 1 = very light to 5 = very dark. Weighted averages were calculated by multiplying the number of chips or fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made using the PCII reference color chart 1206-U.

After color classification, each french fry plug was broken open and internal texture classified as 1 = mealy, 2 = intermediate, or 3 = soggy and a weighted texture index calculated.

Advanced early maturity trials (Table 5). Seven clones and two varieties were included in the early advanced yield trial. Cobbler produced the largest number of CWT per acre though did not significantly outyield other entries. Specific gravities of entries did not differ significantly among the entries. B7589-5, B7621-2, B7642-2, B7664-2 and B7805-1 equalled Monona in processing quality when processed direct from 50° F or after reconditioning for three weeks at 70° F following prolonged storage at 40° F.

Advanced Medium Maturity yield trials (Table 6). Eighteen clones and two varieties were included in the Medium Maturity trial which was harvested 110 days after planting. Yields of the clones did not differ significantly from one or both of the check varieties. B6987-2, B7167-2, B7602-2 and B7768-3 were significantly higher in specific gravity than either variety. B6987-43, B7167-2 and B7631-8 excelled in chip quality from prolonged storage at 50° F. Each of the three clones reconditioned satisfactorily at 70° F following storage at 40° F.

Advanced late Maturity yield trial (Table 7). Twenty-one advanced clones and four varieties were included in the advanced late maturity trial which was harvested 120 days after planting. Yields of all clones were equal to or exceed that of one or more of the control varieties. Yields did not differ significantly among the 4 control varieties. B7165-2 and B7620-7 approached significance in yield over Kennebec, the highest yielding variety in the trial. B6987-56, B7151-4 and B7619-15 were quite high in specific gravity. Only entries B6987-56, B7151-4, B7155-3 and B7200-26 processed acceptably direct from 50° F. B6987-56, B7151-4, B7200-26, B7618-6, B7619-15, B7694-1 and B7909-5 processed well after reconditioning 3 weeks at 70° F from prolonged storage at 40° F. Kennebec did not recondition satisfactorily during a 3-week period at 70° F following storage for four months at 40° F.

Advanced russet yield trial (Table 8). Twenty-nine clones and four varieties were included in the russet yield trial. The trial was harvested 120 days after planting.

All but entries B7188-56, B7587-5, B7637-9, B7678-8 and B7684-7 were earlier maturing than Russet Burbank, Targhee and Nampa. B7629-1, B7678-17, B7679-9, B7684-3, B7684-4, B7711-11, B7715-11, B7783-6 and B7813-5 were earlier maturing than Norgold Russet. Twenty-five of the clones equalled or exceeded the yields of the names varieties. Clones B7585-7 and B7610-1 were the only clones which chipped satisfactorily direct from 50° F storage. Eighteen of the clones produced french fries equalled to or better than Russet Burbank when fried directly from 50° F. Eleven clones produced french fries exceeding those of Russet Burbank in quality after reconditioning from 40° F storage for three weeks at 70° F. In general, specific gravity of the russet selections tend to be lower than desired, tuber conformation somewhat too irregular and russetting is of coarse nature.

Field resistance to late blight. Thirteen clones, previously identified as highly resistant to late blight in field test plots, and Kennebec were grown in two separate randomized plots. Both plots were exposed to infection with late blight during the remainder of the season following inoculation of Green Mountain spreader rows in early August. One plot was sprayed with a fungicide on a 10-11 day schedule beginning in mid-July. The other plot was unsprayed except with a fungicide. By Mid-September disease indices for Kennebec in the unsprayed plot was 4.5 and in the sprayed plot 0.0 on a 1-5 scale. Maximum disease index on any resistant clone in the unsprayed plot was 2.0 and 0.0 in the sprayed plot. Differences in yields were noted for the same clones between the two plots but their rank were generally the same in both plots. Yields of Kennebec were 310 CWT/A in the unsprayed plot and 460 CWT in the sprayed plot. Sebago, included in the unsprayed only, with a disease index of 4.8 yielded 167 CWT/A.

Summary: Despite the relatively short, moist growing season (83 days) early generation selection as a group showed a material increase in specific gravity and chipping quality. More depth in tuber confirmation of newer round type selections and length and depth in russet selections were apparent. Inventories of clones with multigenic resistance to late blight, race A of the golden nematode, corky ringspot virus and potential for processing directly from cold storage were increased. Immunity to virus Y and resistance to 3 races of the golden nematode were entered into the multipest resistance germplasm development program. B6987-56, a widely adapted, high quality clone with resistance to virus X and race A of the golden nematode, is scheduled for release this winter in cooperation with Florida, Virginia, New Jersey, and Maine. Four russet, high quality clones with differing levels of pest resistances are on maximum seed increases for grower trials in 1976. Fourteen advanced generation clones were entered in "Breeder's Interregional Trials" for further adaptability, quality and pest resistance evaluations. Most of these and additional promising selections are in State cooperator trials in the Northeast, Midwest, South and in the Mid-Atlantic area.

Table 1. Distribution of first-year seedling tubers and true seed of selected parental combinations in the United States from BARC-West, Beltsville, Maryland 1973-1974

Location	Cooperator	Number		
		Progeny	Seedling Tubers	True Seed
Alaska	Curtis Dearborn	63	4,384	
Colorado	James Twomey	71	8,215	
Illinois	J. M. Wilholm	1		60,000
Kansas	Thomas P. Wagner	15	1,435	
Maine	David R. Wilson	299	43,500	
Minnesota	Florin Lauer	54	5,530	
North Carolina	Frank Haynes	40	5,029	
North Carolina	Frank Haynes	40		20,000
Totals		543	68,093	80,200

Table 2. Distribution of varieties and advanced clones to cooperating states.

Location	Cooperator	Number	
		Varieties	Clones
Alabama	J. L. Turner		14
Alaska	Curtis Dearborn		20
Connecticut	Authur Hawkins		1
Florida	James Shumaker	12	165
	Pete Weingartner	2	18
Idaho	Dexter Douglas		42
Maine	F. R. Holbrook	5	30
	S. S. Leach	3	98
	R. V. Akeley		17
Maryland	Raymond Rebois		41
	W. W. Cantelo	1	2
	Howard Heggstad	4	
	Howard Hruschka	1	
Mississippi	J. M. Cannon	2	18
	C. P. Hegwood Jr.		
Nebraska	Robert O'Keefe		1
New Jersey	Melvin Hennenger		146
	C. E. Cunningham		3
New Mexico	J. R. Bucholz	1	
New York	Joseph Sieczka	6	12
	Edward Jones	4	1
	R. L. Plaisted		5
	M. B. Harrison		109
	R. H. Johansen		1
North Dakota	J. P. Sleesman		51
Ohio	L. L. Sanford		
	J. D. Harrington		4
	E. B. Kalan	6	
Pennsylvania	James Watts		39
	W. R. Sitterly	2	12
South Carolina	J. C. Miller		6
Texas	B. A. Perry	2	5
	Bayette Graves	13	131
Virginia	Robert Kunkel		22
Washington	Melvin Rominski		34
Wisconsin	Henry Darling		1
Totals		64	1049

Table 3. Varieties, clones, seedling tubers and true seed sent to foreign countries.

Country	Cooperator	Number of:			
		Varieties	Clones	Seedling Tubers	True Seed
El Salvador	D. D. Gull	1	9		
India	Hari Kishore				4200
Iraq	M. Abdul Hadi	10			
Israel	James Krikun	3	1		
Korea	H. Hyland		1		
Lebanon	Primo Accatino	2			
Liberia	H. Hyland	2			
Netherlands	H. Hyland	8	1		
New Zealand	R. G. Robinson	2			
Nigeria	Dale Suchomel			2141	
Panama	Bernardo Ocana	3	3		
Pakistan	Said Kamal Khan	7	33		
	A.H.K. Ackakzai	7	33		
	I. A. Razui	7	33		
	Altof Hussain	7	33		
Peru	R. A. C. Jones				300
Poland	J. Rasinski	25			
Senegal	H. Hyland	5			
West Africa	Sidney Madore	10			
Totals		92	147	2141	4500

Table 4. Weather data, Aroostook Farm, Presque Isle, Maine, May-October 1974.

Date	Temperature 7-day Average °F		Precipitation 7-day total inches
	Maximum	Minimum	
5/1 - 7	51	30	.99
5/8 - 14	54	36	1.48
5/15 - 21	64	38	.15
5/22 - 28	51	39	1.22
5/29 - 6/4	56	40	.15
6/5 - 11	80	47	.05
6/12 - 18	76	52	.89
6/19 - 25	71	53	2.04
6/26 - 7/2	75	52	.54
7/3 - 9	76	54	1.51
7/10 - 16	77	53	1.91
7/17 - 23	74	52	.65
7/24 - 30	74	54	.28
7/31 - 8/6	77	59	1.13
8/7 - 13	80	49	.12
8/14 - 20	78	50	2.42
8/21 - 27	76	54	.50
8/28 - 9/3	70	49	.22
9/4 - 10	68	44	.72
9/11 - 17	68	45	.92
9/18 - 24	60	37	.76
9/25 - 10/1	60	42	.87
10/2 - 8	53	36	.37
10/9 - 15	47	29	.40

Table 5. Yield, tuber size distribution, tuber rating specific gravity and some processing qualities of advanced clones and varieties harvested 100 days after planting.

Pedigree	Marketable Cwt/1 7/8"	Percent of total yield	Percent of yield 1 7/8" and above				Tuber- 1/ rating	Specific- 2/ Gravity	50° F3/			40-70° F3/		
	and above		1 7/8-2 1/4	2 1/4-3 1/4	3 1/4-4	4			Color Chip	FF	FF Tex.	Color Chip	FF	FF Tex.
B7589-5	311.22	96.4	15.0	72.1	10.4	2.5	2	83	7.8	2.7	1.1	7.4	3.0	0.9
B7620-4	309.27	94.7	17.8	76.1	5.4	0.6	2	78	8.8	3.3	1.1	8.7	3.6	1.0
B7621-2	331.34	94.2	20.5	66.1	10.0	3.4	1	81	7.3	2.2	1.0	7.4	2.0	0.9
B7642-2	271.67	95.1	19.7	63.8	14.2	2.9	2	79	7.3	2.6	1.0	7.2	2.6	0.9
B7649-5	329.16	96.5	13.5	66.4	20.1	0.0	2	82	8.4	3.0	1.0	7.9	2.9	1.0
B7664-2	294.29	93.5	26.6	62.9	9.8	0.7	2	83	7.4	2.4	1.1	6.5	1.9	0.8
B7805-1	282.2	93.1	21.3	64.4	14.2	0.0	1	77	8.1	3.4	1.1	7.3	2.7	1.0
Monona	303.81	94.5	24.0	59.3	16.2	0.0	2	79	7.1	2.4	1.0	7.4	2.4	1.0
Cobbler	352.79	94.2	24.4	61.4	10.2	3.6	1	79	7.6	3.1	1.0	8.0	2.8	1.0
LSD .05	73.2							9.3	1.4	1.5	0.2			

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory.

Table 6. Yield, tuber size distribution, tuber rating, specific gravity and some processing qualities of advanced clones and varieties harvested 110 days after planting.

Pedigree	Marketable Cwt/1 7/8" and above	Percent of total yield	Percent of yield 1 7/8" and above				Tuber 1/ rating	Specific 2/ Gravity	50° F 3/			40-70° F 3/		
			1 7/8-2	2 1/4-3	3 1/4-4	4			Color		Color			
									Chip	FF	Chip	FF		
B6987-2	387.11	95.9	13.1	57.3	25.0	4.5	2	91	5.6	3.3	0.9	7.1	2.2	0.7
B6987-18	396.63	98.3	9.2	56.0	20.8	13.7	2	85	7.8	2.5	1.0	7.9	2.4	1.0
B6987-43	315.74	98.1	9.6	53.8	33.3	3.1	1	92	5.4	1.4	0.5	5.4	1.1	0.6
B7167-2	289.22	98.9	29.4	69.8	0.7	0.0	3	91	6.1	1.5	1.1	6.1	1.6	1.0
B7573-3	384.77	95.5	18.5	64.1	12.8	4.8	2	84	7.8	2.8	0.9	7.5	2.6	1.0
B7592-1	379.70	94.9	26.7	67.4	6.0	0.0	2	83	8.3	3.5	1.0	7.8	3.2	1.0
B7595-3	343.20	93.2	28.2	58.4	13.4	0.0	1	79	8.1	2.8	1.0	8.4	2.7	1.0
B7602-2	324.32	93.3	26.0	67.5	13.0	1.4	2	91	8.2	2.8	0.0	7.9	3.2	0.8
B7603-6	347.33	94.7	19.8	62.2	17.2	0.8	1	79	8.3	2.8	1.0	8.3	3.8	1.0
B7613-1	334.62	89.2	35.9	49.7	13.1	0.0	2	75	8.8	3.8	1.0	8.8	3.4	1.0
B7621-9	348.89	96.8	16.8	71.8	11.4	0.0	3	77	8.8	3.8	1.0	8.4	3.3	1.0
B7631-8	369.95	93.7	20.9	63.3	15.8	0.0	1	85	6.8	2.0	1.0	6.6	1.0	1.0
B7650-9	329.78	94.2	29.6	66.4	3.3	0.6	2	83	7.9	3.2	1.0	7.5	2.4	1.0
B7680-3	356.30	93.1	26.5	65.2	9.6	2.6	2	79	8.1	2.6	1.1	8.2	2.8	1.1
B7767-1	326.43	94.6	20.8	69.7	9.3	0.0	1	85	7.2	2.0	0.9	7.1	2.4	0.9
B7768-3	387.50	97.3	16.6	66.2	13.4	3.7	1	91	8.0	3.2	1.0	7.1	2.5	0.0
B7768-4	383.37	96.3	16.9	60.1	18.7	4.4	2	87	8.3	3.0	1.1	8.5	2.9	0.9
B7802-2	360.20	96.5	17.5	64.1	17.2	1.3	2	80	7.9	2.9	1.0	7.9	3.1	1.0
Cobbler	348.11	92.0	25.1	65.7	9.2	0.0	1	86	7.9	3.1	1.0	7.8	2.6	1.0
Superior	333.68	96.2	21.7	68.0	9.5	0.7	1	85	7.5	2.8	0.9	7.0	2.5	0.9
LSD .05	52.9							4.3	0.6	0.5	0.2			

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex. 1-2 satisfactory

Table 7. Yield, tuber size distribution, tuber rating, specific gravity and some processing qualities of advanced and varieties harvested 120 days after planting.

Pedigree	Marketable Cwt/1 7/8" and above	Percent of total yield	Percent of yield 1 7/8" and above				Tuber- 1/ rating	Specific- 2/ Gravity	50° F ^{3/}				60-70° F ^{3/}			
			1 7/8-2 1/4	2 1/4-3 1/4	3 1/4-4	4			Color		FF		Color		FF	
									Chip	FF	Tex.	Chip	Color	FF	Tex.	
36955-14	403.26	96.5	14.3	67.9	13.3	4.4	2	90	7.7	2.4	0.9	7.6	2.3	0.8		
36987-1	411.29	94.8	16.4	63.0	18.6	2.0	2	90	8.2	2.6	1.0	7.8	2.2	1.0		
36987-56	400.00	96.2	17.3	58.9	19.5	4.2	3	101	7.0	1.7	0.8	6.4	1.5	0.7		
36995-19	435.08	94.9	19.1	61.6	13.3	5.8	2	78	7.8	2.6	0.8	8.0	2.6	1.0		
37139-4	340.86	96.0	17.1	65.2	16.0	1.6	2	98	7.2	2.0	0.6	7.1	2.3	0.7		
37141-1	360.60	97.5	14.8	74.9	10.4	0.0	1	98	8.3	2.5	0.9	7.8	2.7	0.8		
37151-4	372.29	96.0	18.5	63.5	16.4	1.9	1	102	6.6	1.2	0.6	7.3	1.3	0.6		
37155-3	378.69	94.2	18.1	56.6	18.1	7.1	2	77	6.6	1.7	1.0	7.5	2.1	1.0		
37165-2	494.75	96.1	29.9	49.4	17.4	3.4	3	82	8.5	2.9	1.0	6.1	2.8	1.0		
37165-8	444.60	95.8	16.6	71.4	10.7	1.2	2	83	7.9	2.4	1.0	7.5	2.1	1.0		
37200-26	378.53	94.2	22.0	72.0	6.0	0.0	2	86	6.2	1.6	1.0	6.0	1.5	0.9		
37603-1	406.00	91.6	33.6	57.6	7.3	1.2	3	82	7.9	2.1	1.0	7.8	1.9	1.0		
37618-6	385.71	93.0	15.9	73.5	13.1	0.7	3	85	7.5	2.2	1.0	6.9	1.5	0.9		
37619-15	343.37	97.6	38.0	62.0	0.0	0.0	1	107	7.6	2.7	0.6	6.7	1.5	0.5		
37620-7	502.32	96.7	20.5	68.9	9.0	1.5	1	84	8.4	2.9	1.0	7.4	2.2	0.9		
37631-5	428.61	95.2	15.8	61.0	15.8	7.5	2	77	7.7	2.3	1.1	7.5	2.0	1.0		
37632-3	458.09	97.3	20.8	63.4	10.9	4.9	2	90	8.2	2.4	0.9	8.2	2.8	1.0		
37694-1	361.00	93.3	32.8	61.3	5.2	0.6	2	89	7.4	2.0	1.1	6.2	1.4	1.0		
37763-3	463.94	93.0	15.0	66.6	18.2	2.7	1	77	9.0	3.8	1.0	9.0	2.0	1.0		
37767-2	389.61	90.2	33.1	66.9	0.0	0.0	2	89	8.5	2.3	1.0	7.5	2.2	1.2		
37809-5	378.14	92.6	39.0	59.2	1.8	0.0	2	94	7.4	1.4	1.0	6.3	1.5	0.6		
Katahdin	340.86	96.0	8.1	57.5	29.3	6.2	3	80	8.9	3.6	1.1	8.0	2.8	1.0		
Abnaki	443.04	92.1	14.9	72.7	15.7	0.5	3	87	8.5	2.9	1.0	8.3	2.4	1.1		
Kennebec	460.43	96.4	16.8	65.6	11.7	5.8	2	88	7.8	2.6	1.0	7.5	2.6	1.0		
Tudson	401.31	96.3	11.0	42.9	28.7	17.2	1	79	8.9	3.8	1.0	6.5	3.7	1.1		
LSD .05	63.8							4.1	0.6	0.5						

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex. 1-2 satisfactory

Table 8. Maturity, yield, tuber distribution, tuber rating, specific gravity and some processing qualities of advanced russet clones and varieties harvested 120 days after planting.

Pedigree	Marketable Cwt/1 7/8" and above	Percent of total yield	Percent of yield 1 7/8" and above				Tuber ^{1/} rating	Specific ^{2/} gravity	50° F ^{3/}		40-70° F ^{3/}			
			1 7/8-2 1/4	2 1/4-3 1/4	3 1/4-4	4			Color		Color			
									Chip	FF	Chip	FF		
B7188-56	377.0	87.5	42.4	46.6	9.9	2.0	L	78	7.8	2.9	1.2	8.0	2.7	1.1
B7196-64	279.0	93.2	23.8	63.8	12.4	-	M	82	7.5	2.1	1.2	8.1	3.1	1.1
B7196-74	308.5	95.2	14.6	46.7	27.9	10.8	M	77	8.3	3.5	1.5	8.9	3.5	1.3
B7583-6	392.5	96.1	13.9	66.2	15.7	4.1	M	92	8.2	3.2	1.1	8.4	3.2	1.1
B7583-19	336.0	96.3	14.9	61.2	22.2	1.8	M	92	7.2	2.3	0.9	7.5	2.5	0.9
B7587-5	238.5	88.2	38.4	52.2	8.2	1.4	L	95	6.9	1.9	1.0	6.8	2.8	1.0
B7610-1	368.5	94.9	14.7	45.9	27.0	12.3	ME	101	7.1	1.6	0.7	6.5	1.5	0.8
B7629-1	460.5	98.2	8.4	51.4	29.2	11.0	E	81	8.0	3.1	1.0	8.8	3.9	1.0
B7637-9	378.0	97.3	11.5	47.4	28.7	12.4	L	79	8.2	3.4	0.9	8.7	3.8	1.0
B7669-2	366.5	94.1	14.0	47.3	22.7	16.0	M	66	8.8	4.0	1.4	9.0	4.0	1.7
B7678-2	336.0	93.1	19.3	56.8	19.4	4.4	M	76	8.5	3.6	1.3	8.7	3.9	1.1
B7678-6	270.5	87.4	39.9	44.0	14.4	1.4	L	82	7.9	2.5	1.1	8.0	2.8	1.1
B7678-8	339.0	93.5	25.5	59.3	10.6	4.6	M	79	7.6	2.6	0.7	8.2	2.9	0.9
B7678-12	317.0	92.8	26.7	59.0	12.2	2.3	M	79	7.6	2.4	1.3	7.5	2.1	0.9
B7678-13	373.5	94.4	19.0	60.2	18.5	2.2	M	70	8.7	3.1	1.3	9.0	3.7	1.1
B7678-17	347.5	96.7	14.1	55.7	23.5	6.7	ME	82	7.2	2.3	1.1	8.1	2.8	1.4
B7679-9	403.5	97.9	6.9	33.6	36.8	22.6	E	76	9.0	4.0	1.0	9.0	4.0	1.2
B7680-6	352.0	97.0	20.0	59.4	15.8	4.7	M	79	7.8	3.0	1.0	8.9	3.2	1.0
B7680-10	368.0	95.6	20.2	71.3	8.3	-	M	78	7.4	2.2	1.0	7.8	2.7	1.0
B7684-3	362.5	97.4	11.6	47.2	29.4	11.7	ME	75	8.8	3.7	1.0	9.0	3.4	1.0
B7684-4	368.0	96.5	11.3	50.8	27.6	10.9	ME	70	8.5	3.5	1.0	8.9	3.6	1.0
B7684-6	230.0	94.1	17.9	58.0	20.9	4.1	M	72	8.5	3.4	1.1	8.9	3.4	1.3
B7684-7	305.0	92.4	30.7	59.2	9.2	0.9	ML	91	8.6	2.1	1.1	7.0	2.0	0.9
B7685-8	356.5	94.8	19.1	60.2	19.4	1.2	ML	79	8.5	2.6	1.1	9.0	4.0	1.0
B7711-2	326.5	91.8	21.0	58.2	18.7	2.0	M	78	8.1	3.0	0.9	8.7	3.9	1.1
B7711-11	385.0	96.7	13.3	58.3	24.2	4.3	M	78	8.2	3.0	1.0	8.7	3.6	1.1
B7715-11	392.0	95.7	17.5	62.9	19.0	0.8	M	79	7.7	2.6	0.9	8.2	3.4	1.1
B7783-6	404.5	97.7	10.9	46.5	29.3	13.3	M	83	8.4	3.9	1.0	8.7	3.7	1.1
B7813-5	337.0	93.6	14.4	55.2	23.0	7.3	M	78	7.7	3.0	1.2	8.4	3.7	1.1
Norgold Russet	383.5	93.1	23.3	58.2	16.4	2.1	M	80	8.7	3.7	1.0	8.9	3.8	1.1
Russet Burbank	360.5	90.2	33.2	65.5	8.6	2.2	L	91	7.6	3.0	1.0	8.2	3.0	0.9
Targhee	359.0	91.9	30.5	60.5	7.1	1.9	L	87	8.5	3.5	1.0	8.9	3.8	1.0
Nampa	389.0	91.3	30.6	54.8	11.3	3.3	L	92	8.7	4.0	1.1	8.7	3.8	1.1
LSD .05	42.0							3.5	0.7	0.73				

1/ 1 = very poor to 5 = outstanding 2/ 1.0 omitted 3/ chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory.

USDA, Presque Isle, Maine

James Frank, David Wilson, and R.E. Webb

Disease Resistance Evaluations

The USDA potato disease testing program is an important step in the development of new breeding materials. This testing is carried out on Aroostook Farm in Presque Isle, Maine. The tests are conducted in isolated plots to prevent interference from other disease tests. The purpose of these tests is to remove the very susceptible seedlings from the breeding stocks and to rate all other seedlings as to their degree of resistance or tolerance. These reactions are merely indications of how the seedlings respond to disease situations under Maine environmental conditions. The resultant reactions will vary somewhat from year to year in the same location and also in different locations in the same year.

In 1974 the weather conditions favored an early development of late blight, with cool evening temperatures and also 15 days of measurable rainfall. These conditions continued through the first week in August. These same conditions did not favor optimum common scab or Verticillium wilt development, however significant results were obtained. In this year we also chose to delete the early blight trial as conditions the past few years were not favorable for good disease evaluation.

Resistance to Verticillium Wilt (*Verticillium albo-atrum*). Inoculum for this test was grown in potato dextrose broth in shake culture. The bud cells from each flask were pooled and adjusted to 80,000 cells per ml. Two isolates of the pathogen were used to insure pathogenicity. The tubers of the test clones were cut, dipped with the inoculum, and planted immediately. The inoculated seedpieces were covered with soil, and a full hill was made immediately after planting. The test consisted of two four-hill plots per pedigree.

Wilt readings were made on 7 separate days starting in late July. The final readings for the two replications were averaged and reported in the tables following. Readings were made on a 0-9 scale with zero indicating no disease and nine signifying plant death. The average rating for the susceptible check Superior was 9.0 while the resistant variety Abnaki was 2.8 and Houma, moderately resistant, averaged 5.5.

After tubers were harvested, readings were taken to determine the percentage of tubers in each test showing pink eye, a bacterial disease which appears after harvest or storage. This organism has generally been associated with Verticillium, thus the tubers harvested in the Verticillium plot were all washed and examined. In the following tables, the reading in the pink eye column is reported as the percentage of total tubers infected in a pedigree.

Resistance to Lake Blight (*Phytophthora infestans*). Test clones were planted along with the variety Green Mountain, which served as a susceptible spreader. The Green Mountains were planted as guard rows and every third row in the plot. The plot consisted of two replications of a two-hill plot. The plot was inoculated

with a zoospore suspension, field isolation (unknown race) in the second week of July and twice a week thereafter until the Green Mountains showed a heavy infection. Readings were taken once a week until plants were ready for harvest. Readings were made on a 0-9 scale with zero indicating no disease and nine signifying complete susceptibility. The susceptible Green Mountain variety averaged 9.0 while Kennebec, resistant to race 0 averaged 7.5. The prevalent race in the plot at the end of the season was race 1,2,4.

Resistance to Common Scab (*Streptomyces scabies*). Tubers of the test clones were planted in the same field used in previous years for this test. The test consisted of two replications of a two-hill plot with susceptible Green Mountain planted as guard rows and every third row in the plot. The tubers were dug after Labor Day, and each tuber was rated and placed into a class. The two figures in the tables represent the number of tubers observed and the disease rating. The figure for disease rate is surface area affected/lesion type. For area: 0 = none; 1 = 1-19%; 2 = 20-29%; 3 = 40-59%; 4 = 60-79%; and 5 = 80-100%. For type: 0 = none; 1 = small, superficial lesions; 2 = medium - large but superficial; 3 = large, slightly raised, or sunken; 4 = large and rough; 5 = coalesced and pitted. Green Mountain, the susceptible check, averaged 3/3 while the resistant Cherokee averaged 1/1.

Presque Isle Table 1, Pedigrees tested in all disease trials, 1974.

Pedigree	Scab	Vert	Pinkeye	Late Blight
B7516-1	1/1	6/6	11	9.0
B7516-2	1/2	8.5	0	9.0
B7516-3	2/3	8.0	0	9.0
B7516-6	1/1	6.8	0	9.0
B7516-7	1/1	6.4	22	9.0
B7516-9	1/2	5.9	0	9.0
B7516-10	2/1	5.4	0	9.0
B7529-1	1/2	7.0	0	5.5
B7529-5	1/1	7.9	17	1.5
B7529-9	0	7.3	0	9.0
B7529-13	1/2	7.3	0	9.0
B7552-3	1/3	8.1	38	0.0
B7583-23	0	7.6	0	9.0
B7583-24	0	5.5	0	9.0
B7584-12	1/2	3.8	15	9.0
B7603-8	T/2	5.8	0	9.0
B7603-9	1/2	8.8	0	9.0
B7630-20	2/4	8.5	0	9.0
B7633-3	2/3	5.8	0	9.0
B7633-6	1/2	8.5	0	9.0
B7633-12	T/1	8.8	9	9.0
B7636-15	T/1	8.7	0	9.0
B7636-19	1/3	7.9	0	9.0
B7636-22	2/3	7.9	0	9.0
B7678-18	1/3	7.9	0	9.0
B7679-11	T/1	6.3	0	9.0
B7680-11	1/2	8.0	20	9.0
B7680-12	2/3	8.3	17	9.0
B7744-5	1/1	2.8	0	9.0
B7744-6	1/1	8.5	0	7.0
B7780-2	1/2	8.9	0	9.0
B7783-8	1/3	9.0	25	9.0
B7828-1	1/4	5.9	0	9.0
B7828-3	1/2	8.4	0	9.0
B7828-8	1/3	7.5	19	9.0
B7828-10	2/4	2.1	0	9.0
B7828-13	1/3	7.3	0	9.0
B7828-18	3/3	8.3	0	9.0
B7828-19	3/3	6.6	25	9.0
B7838-1	1/4	7.9	8	9.0
B7838-5	1/3	4.1	0	8.0
B7838-9	1/2	8.1	0	9.0
B7862-4	2/4	8.8	0	9.0
B7891-3	2/4	8.5	23	8.5
B7902-2	2/3	8.0	0	0.0
B7902-4	2/4	8.3	0	9.0

Continued next page

Presque Isle Table 1. Pedigrees tested in all disease trials, 1974.

Pedigree	Scab	Vert	Pinkeye	Late Blight
B7902-7	1/2	8.1	44	8.5
B7902-8	2/3	4.1	0	0.0
B7902-9	2/3	7.5	0	0.0
B7902-11	2/4	7.4	0	9.0
B8178-1	2/3	8.5	0	0.0
B8178-4	3/3	7.9	0	0.0
B8178-5	3/3	4.3	0	0.0
B8180-2	1/1	6.5	0	8.0
B8181-1	3/4	8.5	23	3.0
B8185-2	1/2	9.0	0	9.0
B8185-3	2/3	7.0	0	9.0
B8185-4	3/3	9.0	15	9.0
B8185-5	1/1	9.0	0	9.0
B8185-6	1/2	9.0	0	9.0
B8185-10	1/1	8.9	0	9.0
B8185-11	3/1	7.6	10	7.0
B8186-3	1/2	9.0	0	8.5
B8188-1	1/2	8.1	0	9.0
B8188-2	0	8.0	0	9.0
B8188-6	1/1	8.0	0	9.0
B8188-8	3/3	6.1	0	9.0
B8188-9	2/2	6.5	13	9.0
B8189-1	2/2	9.0	0	9.0
B8193-1	1/1	8.5	0	9.0
B8202-1	1/3	9.0	0	8.5
B8206-2	1/3	8.0	0	9.0
B8210-1	1/1	5.3	0	7.0
B8210-2	1/1	9.0	0	9.0
B8210-3	1/1	9.0	0	9.0
B8212-1	1/1	9.0	0	9.0
B8212-2	1/1	8.5	0	9.0
B8214-4	0	6.3	0	8.0
B8214-6	1/1	7.8	0	9.0
B8214-9	0	6.5	0	7.5
B8218-4	1/1	6.3	0	9.0
B8221-2	0	8.9	0	9.0
B8222-1	0	5.9	0	7.5
B8222-3	3/2	8.8	17	8.0
B8223-2	1/1	7.5	0	9.0
B8229-1	1/3	7.5	33	8.0
B8232-1	0	4.6	0	0.0
B8235-5	1/1	7.4	0	0.0
B8247-1	2/2	9.0	0	9.0
B8249-2	1/2	7.4	0	8.5
B8260-3	2/3	8.3	17	1.0
B8261-3	2/3	8.5	6	0.5
B8262-2	1/2	4.4	0	6.5

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Presque Isle Table 1. Pedigrees tested in all disease trials. 1974. contd.

Pedigree	Scab	Vert	Pinkeye	Late Blight
B8264-1	3/3	7.8	0	0.5
B8275-10	0	2.9	0	9.0
B8275-15	1/1	7.0	0	9.0
B8275-17	2/4	7.5	15	9.0
B8276-5	2/4	5.4	46	9.0
B8276-13	1/1	5.4	0	9.0
B8280-5	1/1	6.8	0	9.0
B8280-7	3/4	7.5	18	9.0
B8280-8	1/2	3.0	11	8.0
B8280-11	2/3	4.4	0	4.5
B8280-13	1/2	6.4	0	6.5
B8281-4	3/3	8.1	7	9.0
B8281-5	1/1	3.4	0	8.5
B8284-6	1/1	6.4	0	9.0
B8285-1	1/2	5.5	0	8.0
B8285-2	0	3.5	0	9.0
B8285-3	2/3	6.3	0	9.0
B8288-6	1/1	6.1	0	8.5
B8289-4	3/4	5.4	17	8.5
B8290-5	1/1	9.0	0	9.0
B8302-1	1/2	6.5	0	9.0
B8302-2	1/3	8.3	30	9.0
B8302-3	2/2	7.9	2	9.0
B8302-5	2/4	8.6	7	9.0
B8304-1	2/4	4.4	0	5.5
B8308-3	3/1	4.7	6	8.0
B8308-5	2/4	8.1	0	9.0
B8308-6	1/3	6.0	0	9.0
B8308-11	1/2	2.5	0	9.0
B8310-2	0	8.8	0	9.0
B8310-13	0	7.5	0	9.0
B8313-4	2/3	5.4	0	5.5
B8114-5	0	9.0	0	9.0
B8114-9	2/2	8.3	0	9.0
B8316-3	2/3	8.4	0	9.0
B8318-4	2/2	6.9	0	9.0
B8331-3	1/1	7.0	0	9.0
B8331-4	0	8.8	0	9.0
B8332-2	1/1	5.6	0	9.0
B8332-10	0	3.8	0	9.0
B8336-3	1/1	5.0	0	9.0
B8337-8	1/4	5.6	0	5.5
B8338-6	3/3	4.8	0	9.0
B8338-7	2/2	5.1	3	9.0
B8339-1	1/1	8.9	0	9.0
B8339-4	2/3	8.9	0	9.0
B8345-5	1/2	6.8	0	9.0

Continued
next page

Presque Isle Table 1. Pedigrees tested in all disease trials. 1974. contd.

Pedigree	Scab	Vert	Pinkeye	Late Blight
B8347-2	2/2	6.3	0	9.0
B8348-1	1/1	7.6	0	9.0
B8348-4	1/1	7.5	0	9.0
B8350-5	0	7.8	2	9.0
B8352-1	1/3	8.3	0	9.0
B8352-3	2/3	8.9	0	9.0
B8354-11	2/2	8.5	12	9.0
B8356-1	2/2	8.0	0	9.0
B8357-1	1/2	1.9	0	8.0
B8357-2	1/1	5.1	2	8.5
B8357-4	1/2	6.3	0	8.5
B8358-1	0	8.8	0	9.0
B8358-6	1/1	7.0	0	9.0
B8359-2	1/3	9.0	0	9.0
B8366-4	1/1	8.9	0	9.0
B8372-2	2/4	8.9	0	9.0
B8375-1	1/1	8.3	5	9.0
B8375-2	3/3	9.0	0	9.0
B8375-3	2/4	9.0	0	9.0
B8375-4	2/3	9.0	0	9.0
B8375-5	1/1	9.0	0	9.0
B8375-7	2/4	9.0	0	9.0
B8377-2	0	8.4	7	9.0
B8385-1	1/2	8.1	0	9.0
B8392-3	2/4	9.0	0	8.0
B8392-4	2/4	6.4	0	9.0
B8392-5	3/4	6.1	0	8.5
B8392-6	2/3	8.5	4	9.0
B8392-7	1/4	6.0	0	8.0
B8393-1	3/3	8.9	0	9.0
B8393-3	3/4	7.4	0	1.5
B8393-5	4/4	7.5	0	0.0
B8393-6	2/4	5.6	0	0.0
B8393-7	3/4	5.5	0	0.0
B8393-8	4/4	8.9	0	0.0
B8395-3	2/4	8.3	0	9.0
B8395-5	2/3	7.8	0	9.0
Cherokee	1/1			
Superior	1/2	9.0	7	
Katahdin	1/3			
Green Mountain	3/3			
Abnaki		2.8	0	
Houma		5.5	4	
Sebago				7.7
Kernn				7.5
Atzimba				0.0

Presque Isle Tabel 2. Pedigrees not tested in all disease trials. 1974.

Pedigree	Scab	Vert	Pinkeye	Late Blight
BA-6893-3		6/1		
BA-6893-4		4.9		
BA-6983-3	1/4			
BA-68504-1	1/1			
BA-69433-3				
BR-7072-12				
B6951-1		8.9		
B6987-1	2/4			
B6980-47	0.0			
B6987-1	2/4			
B6987-148	0.0			
B7147-8				
B7147-15				
B7147-76		7.1		
B7196-1	1/4			
B7196-4	1/2			
B7196-7	1/2			
B7196-8		7.1		
B7196-20	T/1			
B7196-23		8.6		
B7196-36				
B7196-56	1/1			
B7516-1	1/1			
B7669-2		7.9		
B7744-4	2/4	6.0		
B7990-1	1/5			
B7997-11	2/4			
B8004-8	2/4			
B8017-7	2/3			
B8018-2	1/4			
B8018-4	1/4			
B8019-4	2/4			
B8019-7	1/2			
B8024-1	2/3			
B8036-1				
B8036-3	2/3			
B8036-4	1/4			
B8050-1	3/2			
B8050-2	1/3			
B8050-4	1/2			
B8070-7	1/3			
B8073-3	3/3			
B8076-3	1/3			
B8087-6	1/4			
B8088-2	3/4			
B8091-8	3/4			

Continued next page . .

Presque Isle Table 2. Pedigrees not tested in all disease trials. 1974 contd.

<u>Pedigree</u>	<u>Scab</u>	<u>Vert</u>	<u>Pinkeye</u>	<u>Late Blight</u>
B8101-3	1/3			
B8108-3	2/3			
B8111A-5	1/3			
B8113-12	1/3			
B8123-3	2/3			
B8123-11	1/4			
B8123-12	2/4			
B8125-5	3/4			
B8131-1	1/4			
B8132-4	2/5			
B8140-1	2/3			
B8145-1	2/4			
B8148-4	3/4			
B8151-1	1/2			
B8154-9	1/3			
B8275-15	1/1			

INTERREGIONAL POTATO INTRODUCTION PROJECT (IR-1)

R. W. Ross and R. E. Hanneman, Jr.

Introduction of New Stocks. Sixty new stocks were received from six countries (Bolivia, Colombia, Peru, England, Germany, U.S.S.R.). The majority were true seed collections of non-cultivated species provided by the International Potato Center (CIP), Lima, Peru.

Preservation and Increase of Stocks. Approximately 90 percent of the introductions now contained in the collection are maintained as true seed. Satisfactory seed increases of 176 species introductions and 40 interspecific hybrids were obtained under glass, plastic or screen. Recently-harvested seed samples of 158 species introductions were packaged for storage in the National Seed Storage Laboratory.

Germination percentages of 1357 seed lots two to twenty years old were determined. Fifty seedling samples of 191 seed increase lots were grown to detect mechanical admixtures that could happen in the course of the extraction and packaging process.

Classification. Three hundred fifty-five herbarium specimens representing interspecific variability were collected and prepared from seedling populations of 103 interspecific hybrids. Four hundred eighty of the species herbarium specimens collected last year were mounted and labeled for inclusion in the IR-1 herbarium.

Distribution of Stocks. Seed and tuber shipments were sent to potato workers in 12 states within this country and in 12 other countries. Shipments included 1668 seed and 1069 tuber samples of species introductions, and 64 seed and 107 tuber samples of germplasm developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project, involving species introductions.

Over 40 additional copies of the 1972 "Inventory of Interspecific and Inter-variatal Hybrids of Tuber-Bearing Solanum Species" were distributed upon request. A mimeographed listing of 219 species introductions available in the form of tuber families (mainly for the benefit of those without adequate greenhouse facilities) was distributed to 198 potato workers.

Evaluation of Stocks. All of the evaluation data supplied through published and unpublished reports of researches utilizing IR-1 stocks during the year will now be included in the revised "Inventory of Tuber-Bearing Solanum Species" to be published early in 1975.

Seedling populations of some 200 recent species introductions were evaluated in the field for tolerance to freezing temperatures. The somatic chromosome numbers of 393 species introductions were determined.

Usefulness of Findings. The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germplasm and are conducting incessant researches to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Two new potato varieties (Bison, Waimea) were released for commercial production in 1974. One hundred thirty-one of the 135 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigree. These varieties presently compose about 65 percent of the annual seed potato production in the United States.

Basic research programs conducted in several states and other countries are developing information concerning the potential value and diversity of the Solanum species. In 1974, approximately 17 papers, 17 abstracts and six theses reported the use of Solanum introductions.

NORTH DAKOTA

R. H. Johansen and Cooperators^{1/}

North Central Regional Trials - 1974

The North Central Regional Potato Variety Trials have now been conducted for 24 years. In 1974, nine states participated with Nebraska planting two trials, one late summer and the other late fall.

The North Central Regional Potato Trials have been beneficial over the twenty-four years they have been in existence in that they have familiarized research workers and breeders with the genetic material from each state. Also they have familiarized workers with some of the new varieties that have been tested in the trial prior to introduction. Many advanced clones tested in the North Central Trial prior to introduction are now popular varieties in the United States and Canada.

Recent potato variety introductions that have been tested in the North Central Regional Trials:

<u>Progeny No.</u>	<u>Year Released</u>	<u>Released by</u>	<u>Released Name</u>	<u>Parentage</u>
ND6634-2R	1974	North Dakota	Bison	ND4652-2R X ND5124-1R

Environmental Conditions. Soil type ranged from clay loam to course sand. Sandy loam and silt loam were the most common soil type.

Cultural Practices. Fertilizer applications, irrigation, spray programs, vine killing, spacing, etc. were based on local conditions. Insecticides used were Thiodan, Sevin, Thimet at planting, Meta-systox R, Monitor diozinon, Methoxychlor and Bravo. No spray was applied to the South Dakota trial. Fungicides used were Bravo, Maneb (M45), Manzate, Polyram, Du-ter. Lorox and Eptam were the common herbicides used. Vines were either killed by roto-beating, mowing or chemical. Chemicals used were docthal dessicate, dow general, Dinitro.

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Kansas	April 26	July 30	118
Michigan	May 6	Sept. 22	140
Missouri	April '25	August 6	104
Minnesota	April 30	October 10	164
Neb. (late summer)	April 23	August 28	128
Neb. (late fall)	May 22	Sept. 21	123
North Dakota	May 30	Sept. 26	119
Ohio	May 6	October 28	176
South Dakota	April 19	Sept. 11	146
Wisconsin	May 2	Sept. 23	145

^{1/} Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, N. Thompson; Minnesota, F. Lauer; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. H. Johansen; Ohio, A. R. Mosley; South Dakota, P. Prashar; Wisconsin, J. Shoenman, D. Kichefski and S. Peloquin; USDA, R. Well; Alaska, C. Dearborn.

Weather conditions were quite variable during 1974. In the northern states it was quite wet and cool at planting time but warm and dry later on in the summer. In Missouri it was very cool and wet at planting time resulting in poor stands and severe Rhizoctonia. Rainfall was much below average in most states during the summer which resulted in much irrigation in the application of several inches of irrigation water.

Entries. Entries were received from Nebraska, Louisiana, North Dakota, Wisconsin and Alaska. North Dakota supplied the check varieties Norland, Norchip and Red Pontiac. Cobbler was dropped as a check variety in 1974. Cobbler was one of the original check varieties planted when the trial was initiated in 1950.

Nebraska planted a trial at Lincoln and Alliance.

Yield. Total yield and U.S. No. 1 yield are reported in North Central Tables 1 and 2. Trials in Wisconsin and Michigan produced the highest yields. Both locations in Nebraska reported very low U.S. No. 1 yields while other states produced quite comparable average total and U.S. No. 1 yields.

Highest total and U.S. No. yields were found for Red Pontiac, Al 37-68-19, W 718, W 623 and Norland. Red Pontiac has consistently been the highest yielding entry each year and with an average of 391 cwt. per acre in 1974 this was no exception.

Maturity. Norland was the earliest maturing entry while Al37-68-19 was the latest maturing. Only the two North Dakota entries ND7878-1 and ND8767-10R reported to be medium to late in maturity were actually almost as early as Norland and Norchip. Maturity is reported in North Central Table 3.

Total Solids. Total solids are found in North Central Table 4. With an average of 21.3 percent at all locations Al 37-68-19 produced the highest percent total solids. Norchip, with 19.1 percent solids produced the next highest percent total solids. Norland and Red Pontiac produced the lowest percent total solids.

Scab Reactions. Kansas and Nebraska (late fall) produced the highest incidence of scab. Other states reported a rather low reading of scab. Red Pontiac showed the most scab while most other entries exhibited about the same scab resistance as Norland. Scab reactions are found in North Central Table 5.

Internal and External Defects. A summary of grade defects are found in North Central Table 6. A particular weakness of a variety or selection is starred only to call it to the attention of the person responsible for the entry being in trial.

Annual Merit Ratings. Merit ratings are presented for 1972, 1973, 1974.

	<u>1972</u>	<u>1973</u>	<u>1974</u>
1. Alaska 37-68-19	0	0	24
2. (Norland	5	12	18
(Wisc. 623	24	30	18
3. ND6634-2R (Bison)	-	11	16
4. (La 71-710	9	10	15
(Wisc. 729	-	-	15
5. Wisc. 718	-	-	12

Chip Quality. Chip color is found in North Central Table 8. Several advanced selections produced chips almost as light in color as the check variety Norchip. La 71-710, Neb. 47.62-1, Neb. 1.57-11, Neb. 93.55-16, ND7878-1, W 623 and W 718 all made chips of an acceptable color. At certain locations the red selection ND6634-2R now called Bison also produced light chip.

North Central Table 1. Total Yield (Cwt. per acre).

Variety	Early to Med.				Late/Summer				Late Fall				Ave.			
	Early	Med.	Early	Kansas	Mich.	Mo.	Minn.	Neb	Summer	Neb.	No. Dak.	Ohio	So. Dak.	Wisc.	Ave.	
Neb. 1.57-11				304	386	186	236	232		169	228	221	264	445	261.7	
Norland				307	435	184	268	350		260	234	206	277	486	300.7	
Norchip				383	312	216	254	365		282	225	300	260	483	308.0	
Med. to Late																
La 71-710				307	434	231	288	223		63	170	342	311	655	302.4	
La 91-237				313	356	215	246	269		230	172	320	234	617	297.2	
Neb. 47.62-1				288	380	205	200	170		168	207	316	227	575	273.6	
Neb. 93.55-16				322	335	204	184	185		181	193	263	245	525	263.7	
ND6634-2R				292	424	158	224	216		230	191	251	231	512	272.9	
ND7878-1				213	281	124	227	241		243	205	197	248	494	247.3	
ND8767-10R				290	354	164	237	205		195	181	278	266	363	253.3	
W 623				372	448	203	213	341		225	187	360	197	557	310.3	
W 718				282	430	159	231	300		273	217	411	243	623	316.9	
W 729R				301	460	179	277	209		240	203	293	258	606	302.6	
Red Pontiac				429	658	281	318	251		183	250	524	276	739	390.9	
Al 37-68-19				351	407	263	-	298		259	201	348	272	677	341.7	
Average				317	407	198	243	257		213	204	309	254	557		

1/ Nebraska trials (a) planted at Lincoln April 23 and late fall at Alliance May 22.

North Central Table 2. U.S. No. 1 Yield (Cwt. per acre).

Variety	Early	Med.	Early	Kansas	Mich.	No.	Minn.	Late		No. Dak.	Ohio	So. Dak.	Wisc.	Ave.
								Summer Neb.	Fall Neb.					
<u>Early to Med.</u>														
Neb. 1.57-11		267	310	181	217	116	78		220	179	248	385	220.1	
Norland		278	384	181	253	192	141		221	158	259	443	251.0	
Norchip		187	250	211	238	127	76		210	205	244	443	219.1	
<u>Med. to Late</u>														
La 71-710		279	404	226	278	84	25		165	230	300	635	262.6	
La 91-237		268	324	210	229	46	81		155	182	219	579	229.3	
Neb. 47.62-1		264	345	200	183	35	73		185	263	216	532	229.6	
Neb. 93.55-16		266	285	199	167	41	64		176	171	218	474	206.1	
ND6634-2R		229	359	153	204	77	137		181	206	203	461	221.0	
ND7878-1		170	221	117	205	103	75		190	121	239	448	188.9	
ND8767-10R		276	302	519	226	76	69		153	209	249	326	204.5	
W 623		325	385	196	191	79	100		170	255	170	512	238.3	
W 718		256	399	155	222	111	123		204	320	232	601	262.3	
W 729R		258	434	174	270	89	161		188	205	244	588	261.1	
Red Pontiac		403	628	276	301	81	97		243	340	260	717	334.6	
Al 37-68-19		305	363	254	-	109	16		187	271	249	648	266.9	
<hr/>														
Average		269	360	193	227	91	87.7		190	221	237	519		

North Central Table 3. Maturity Classification.^{1/}

Variety	Early				Summer		Late		No. Dak.		Ohio		So. Dak.		Wisc.		Ave.
	Early	Med.	Early	Kansas	Mich.	Mo.	Minn.	Neb.	Neb.	Fall	Neb.	No. Dak.	Ohio	So. Dak.	Wisc.	Ave.	
Neb. 1.57-11	2.0	2.9	2.4	-	-	-	-	3.2	3.5	3.5	3.5	3.0	1.0	1.0	2.0	2.3	
Norland	1.0	2.0	1.0	-	-	-	-	3.7	4.5	4.5	4.5	2.0	1.0	1.0	2.0	2.0	
Norchip	4.0	2.0	2.2	-	-	-	-	3.5	4.0	4.0	4.0	2.3	2.5	3.0	3.0	2.9	
<u>Med. to Late</u>																	
La 71-710	4.0	4.0	3.5	-	-	-	-	3.5	4.0	4.0	4.0	3.5	3.7	4.0	4.0	3.8	
La 91-237	4.0	3.5	3.5	-	-	-	-	3.7	4.2	4.2	4.2	4.3	2.8	4.5	3.0	3.7	
Neb. 47.62-1	3.0	3.3	3.2	-	-	-	-	3.0	3.5	3.5	3.5	3.3	2.2	4.0	3.0	3.2	
Neb. 93.55-16	4.0	2.9	2.9	-	-	-	-	4.2	4.0	4.0	4.0	3.5	2.0	4.5	4.0	3.6	
ND6634-2R	2.0	2.9	2.6	-	-	-	-	2.5	3.7	3.7	3.7	3.0	2.0	1.0	3.0	2.5	
ND7878-1	2.0	1.8	2.8	-	-	-	-	3.2	3.0	3.0	3.0	2.0	2.0	1.0	4.0	2.4	
ND8767-10R	2.0	2.4	3.4	-	-	-	-	3.7	3.2	3.2	3.2	3.0	4.0	3.0	3.0	3.1	
W 623	4.0	3.3	3.2	-	-	-	-	3.5	4.0	4.0	4.0	4.0	3.5	4.0	2.0	3.5	
W 718	4.0	3.5	3.3	-	-	-	-	4.7	4.7	4.7	4.7	4.0	2.3	4.5	4.0	3.9	
W729R	5.0	3.8	3.4	-	-	-	-	5.0	4.2	4.2	4.2	4.3	2.0	4.5	3.0	3.9	
Red Pontiac	5.0	4.0	4.0	-	-	-	-	4.2	3.0	3.0	3.0	3.3	4.5	5.0	4.0	4.1	
Al 37-68-19	4.5	4.0	3.5	-	-	-	-	4.2	4.2	4.2	4.2	4.8	3.2	4.5	5.0	4.2	

- ^{1/} 1 - very early - Norland maturity.
 2 - early - Irish Cobbler maturity.
 3 - medium - Red Pontiac maturity.
 4 - late - Katahdin maturity.
 5 - very late - Kennebec or Russet Burbank maturity.

North Central Table 4. Total Solids

Variety	Early to Med.	Early	Kansas	Mich.	Mo.	Minn.	Late Summer		No. Dak.	Ohio	So. Dak.	Wisc.	Ave.
							Neb.	Fall					
<u>Med. to Late</u>													
La 71-710			15.2	17.5	18.5	15.0	11.7	20.9	15.4	14.3	17.6	18.4	16.5
La 91-237			15.6	16.9	18.9	15.8	13.1	21.2	17.5	14.3	18.0	20.1	17.1
Neb. 47.62-1			16.7	19.9	19.7	17.3	14.3	22.2	19.0	15.4	19.9	20.5	18.5
Neb. 93.55-16			18.8	20.5	21.2	16.2	13.5	22.2	19.4	15.4	20.8	20.9	18.9
ND6634-2R			16.9	16.5	17.5	14.8	11.2	19.7	17.5	14.8	18.6	18.0	16.6
ND7878-1			16.0	17.3	19.0	16.7	14.3	21.2	18.6	15.2	18.8	18.2	17.5
ND8767-1OR			16.9	18.0	19.4	14.8	11.8	19.4	18.4	15.2	20.2	18.8	17.3
W 623			19.4	19.7	22.4	17.3	15.7	18.8	18.6	15.6	18.8	21.2	18.8
W 718			16.0	18.0	19.9	16.5	14.8	22.2	16.5	14.3	17.7	19.9	17.6
W 729R			15.8	20.7	18.9	16.5	13.7	21.2	16.9	16.2	19.5	21.6	18.1
Red Pontiac			13.7	16.2	17.2	14.3	9.2	18.8	16.9	14.3	19.0	19.2	15.9
Al 37-68-19			19.9	23.3	23.5	-	17.3	23.3	21.4	16.5	21.6	24.6	21.3
<hr/>													
Average			16.8	18.4	19.6	15.9	13.3	20.9	18.2	15.2	19.2	19.7	

North Central Table 5. Scab Reactions Report 1/ (most representative scab - area-type)

<u>Early to Med. Early</u>	<u>Kansas</u>	<u>Mich.</u>	<u>Mo.</u>	<u>Minn.</u>	<u>Late</u>		<u>No. Dak.</u>	<u>Ohio</u>	<u>So. Dak.</u>	<u>Wisc.</u>
					<u>Summer</u>	<u>Fall</u>				
					<u>Neb.</u>	<u>Neb.</u>				
Neb. 1.57-11	1-1		None	None	None	1-2	4-2	T-1	None	
Norland	2-1		"	"	"	1-4	1-1	2-3	"	
Norchip	2-1		"	"	"	2-5	T-1	2-1	"	
<u>Med. to Late</u>										
La 71-710	2-1	1-1	None	None	None	1-4	T-1	1-2	None	-3
La 91-237	3-1	4-2	"	"	"	1-3	2-1	T-1	"	-2
Neb. 47.62-1	2-1	1-5	"	"	1-3	1-3	1-1	2-3	"	-4
Neb. 93.55-16	2-1		"	"	None	1-3	1-1	2-2	"	-2
ND 6634-2R	2-1		"	"	"	1-5	1-1	T-1	"	
ND 7878-1	2-1		"	"	"	1-4	1-1	2-2	"	-3
ND 8767-10R	2-1	2-5	"	"	"	2-5	1-1		"	
W 623	101	1-1	"	"	"	1-3	T-1	2-1	"	
W 718	101	3-3	"	"	"	1-4	1-1		"	
W 729R	2-1		"	"	"	1-2	1-2	T-3	"	-2
Red Pontiac	4-1	3-5	"	"	"	2-5	1-1	T-1	"	-5
Al 37-68-19	3-1	1-5	"	"	"	3-5	2-1		"	-4

Area

1/ T - less than 1%	3 - 41% - 60%	1 - small, superficial	4 - larger pustules, shallow holes
1 - 1 - 20%	4 - 61% - 80%	2 - larger, superficial	5 - very large pustules, deep holes
2 - 21% - 40%	5 - 81% - 100%	3 - larger, rough pustules	

North Central Table 6. Summary of Grade Defects.

Variety	External				Internal						
	Early to Med.	Early	Scab	Growth Cracks	Second Growth	Sun Green	Total 1/ Free of Ext. Def.	Hollow Heart	Internal Necrosis	Vascular Discoloration	Total 1/ Free of Int. Def.
Neb. 1.57-11	8.5	1.5	4.5	4.3	86.0	1.5	0.3	2.4	91.4		
Norland	10.7	4.2	5.5	1.1	83.6	0.1	0.6	3.1	94.6		
Norchip	9.5	12.1*	12.7*	12.6	66.6	0.0	1.5	5.4	89.8		
Med. to Late											
La 71-710	8.2	3.6	7.2	9.6	76.8	1.1	3.4	3.6	86.6		
La 81-237	12.3	4.8	16.0*	10.6*	66.4	5.5*	3.1	2.6	82.6		
Neb. 47.62-1	8.7	2.7	6.9	2.2	83.2	1.9	1.8	5.5*	88.1		
Neb. 93.55-16	6.0	3.8	9.3*	4.9	79.5	2.2	7.1*	5.3	79.3		
ND6634-2R	7.8	5.6*	3.1	3.2	85.2	0.4	0.3	2.4	95.9		
ND7878-1	10.0	5.3*	4.7	7.0	81.7	1.6	4.9*	9.7*	79.9		
ND8767-10R	11.3	6.5*	6.2	2.1	80.4	0.4	0.6	2.6	93.2		
W 623	7.5	3.2	7.3	5.4	82.0	0.8	1.9	3.5	89.2		
W 718	5.3	1.7	6.7	11.2*	78.9	3.0*	1.6	2.1	86.7		
W 729R	8.5	2.7	5.9	2.5	85.2	1.0	1.6	2.3	93.5		
Red Pontiac	18.3*	3.3	9.3*	1.6	76.9	0.8	0.6	3.0	93.5		
Al 37-68-19	10.3	5.5*	8.4	3.2	80.0	0.3	0.4	1.3	94.5		

1/ - Percent normal tubers showing no defects (some individual tubers had more than one type of defect).

* - Possible weakness of a variety.

North Central Table 7. Merit Ratings^{1/}

Variety	Early to Med.	Early	Kansas	Mich.	Mo.	Minn.	Late Summer Neb.	Late Fall Neb.	No. Dak.	Ohio	So. Dak.	Wisc.	Total Points
Neb. 1.57-11			2	4			2						8
Norland						5	5	4			4		18
Norchip					3		4		2				9
<u>Med. to Late</u>													
La 71-710			1	1	4				4		5		15
La 91-237													0
Neb. 47.62-1										2			2
Neb. 93.55-16			3	2									5
ND6634-2R						3		3	5			5	16
ND7878-1						1					1		1
ND8767-10R											2		3
W 623			5		5			1	1	5		1	18
W 718							1	2		4		4	11
W 729R				3		4		5				3	15
Red Pontiac					2	2				1			5
Al 37-68-19			4	5	1		3		3	3	3	2	24

1/ Merit Points determined as follows - Merit Rating

1	Merit Points
1	5
2	4
3	3
4	2
5	1

North Central Table 8. Chip Quality.

<u>Variety</u>	<u>1/</u> Kansas	<u>2/</u> Mich.	<u>3/</u> Mo.	<u>4/</u> Minn.	<u>2/</u> Late Summer Neb.	<u>2/</u> Late Fall Neb.	<u>2/</u> No. Dak.	<u>3/</u> Ohio	<u>3/</u> So. Dak.	<u>2/</u> Wisc.
Neb. 1.57-11	4	2		31	3	3	9			6
Norland		4		22	10	4	8			9
Norchip	3	2		37	3	3	8			5
<u>Med. to Late</u>										
La 71-710	3	2		22	5	4	11			8
La 91-237	4	5		28	7	5	9			8
Neb. 47.62-1		2		34	3	6	10			5
Neb. 93.55-16	3	2		36	7	5	8			6
ND6634-2R		3		28	5	2	9 +			7
ND7878-1	3	2		37	4	3	8			6
ND8767-10R		3		29	8	3	10			7
Wisc. 623	3	3		33	4	6	10			4
Wisc. 718	4	2		32	3	4	9			4
Wisc. 729R		5		22	6	8	11			9
Red Pontiac		5		25	10	5	11 +			10
Al 37-68-19	3	4			4	5	9			8

1/ Mini-chip - NPCI Color Chart (Lower the number the lighter the color)

2/ NPCI Color Chart

3/ No data

4/ Agron Reading - (Higher the number the lighter the color)

WISCONSIN

R. E. Hanneman, Jr.

Genetics and Cyto genetics of the Tuber-Bearing Solanum Species
(Cooperative ARS, USDA and Wisconsin Station)

Studies on Genetic Segregation in Trisomics. Gene *df* (deformed flower) which is expressed as short anther in sensitive cytoplasm (Grun et al. 1962), has been incorporated into the trisomic series. Assuming the original trisomics were homozygous dominant for *Df*, the expected segregation ratios were 1:1 for disomic and 2:1 for trisomics for the gene *df*; however, some progenies segregated with a ratio close to 1:0. In order to test homozygosity of the original trisomics for *Df*, these and their diploid parents were crossed as males to the clones with sensitive cytoplasm and recessive gene *df* ($[df]^S dfdf$ or $[df]^S Df df$). Reciprocal crosses were made also to test the presence of other genes controlling anther length. Two diploid parents were found to be homozygous dominant for *Df* while one was found to be homozygous recessive for gene *df*. Four original trisomics which included the homozygous recessive diploid parents were heterozygous for the gene *df*. There were not any other genes involved, since all of the progenies of the reciprocal crosses produced only normal flowers. One trisomic V1682.1, of which both parents were homozygous dominant for *Df*, gave a 2:1 ratio in the segregation progeny. This clone is suspected of being trisomic for the gene *df*.

F_1 trisomics, which were heterozygous for the genes *Ow* and *R*, were selected and crossed to the homozygous recessive markers. The segregation progenies were planted in the greenhouse for scoring this winter.

Trisomics of *S. chacoense* were crossed as females with *S. verrucosum* to transfer recessive gene "1b" into the trisomic series. Only an average of 8.6 percent of the pollinations had berries in this cross. The range was from 0 to 49 percent. Most of the seeds were very poor. These seeds were planted to obtain F_1 trisomics.

Meristem Culture. Preliminary studies with meristem culture were begun this past summer in an effort to bring this technique into use in the IR-1 potato collection. It offers several potential advantages: 1) cultures occupy a small area, 2) mitotic stability is very high in comparison with tissue culture, and 3) it provides a means of cleaning-up virus-contaminated stocks.

ALABAMA

J. L. Turner, Harrison Bryce and Hubert Harris - Main Station
Frank E. Garrett - Gulf Coast Substation
Marlin H. Hollingsworth - North Alabama Horticulture Substation
John Eason and Frank Lowery - Sand Mountain Substation

Irish Potato Variety Trial, Sand Mountain Substation
Crossville, Alabama

Experimental Procedure. Ten named varieties and 26 numbered selections were grown this year for yield trials and chip processing. Entries were from USDA, Frito Lay Company Baldwin County Alabama, Wisconsin and North Dakota. Lime-stone at 1000 pounds per acre was applied the fall of 1973 to raise the soil pH from 5.1. Fertilizer was applied as 750 pounds of 8-8-8 per acre drilled in two bands along each side of the row at covering. Additional fertilizer was applied as 400 pounds of 15-0-15 thirty days after planting. Eptam herbicide at 1/2 gallon per acre was applied broadcast per acre at lay-by. Each entry was replicated 4 times in a randomized block design. Seed pieces were cut to approximately 1-1/2 ounces each and dipped in a solution of 1/2 pound of Dithane M-45 and 15 gallons of water. Seed were spaced 12 inches in the drill with 42-inch row widths. Plot lengths were 20 feet. Seed were planted March 12 and harvested July 18.

Results. Yields were well above what they have been in the recent past. The crop developed well throughout the growing season with no adverse weather conditions. Lines B 7139-4 and B 6987-56 produced excellent yields of marketable potatoes. Both significantly out yielded all the other entries. Frito-Lay 723 and B 6567-12, also produced above 300 bags per acre of size A potatoes. A poor stand reduced the yield of LO 71-82, Frito-Lay 657, Red La Soda, Hi-Plains, Norchip, Superior, La Chipper and LO 71-110. Since all entries were handled the same at Auburn, it would appear that some seed were either immature or were of poorer quality. Seed from the USDA and the Wisconsin Lines were of much higher quality than for the other entries. Wisconsin 729R and La Rouge produced the highest yields of the red entries. Additional information is presented in Table 1 about potato characteristics.

Processing qualities are presented in Table 2 for the 1974 entries. Line B 6987-56 had the highest total solids of all entries. Chips made from B 6987-56 did not rate very well in color. Total solids for B 5987-56 have been outstanding for the past three years. Table 3 presents comparisons of several varieties and breeding lines for total solids and chip evaluations. Again, B 6987-56 has not produced good chip color in our test.

Table 1. Potato Variety Trial, Sand Mountain Substation, Crossville, Alabama - 1974

Variety	Marketable yield per acre			Plant stand at harvest	Eye depth	Eye size	Skin color	Shape	E app
	Total	Size A ^{1/}	Size B						
	Cwt.	Cwt.	Cwt.						
B7139-4	354.70	338.36	16.34	100	S	SS	Wh-SR	Long	4.
B6987-56	352.37	336.81	15.56	98	M	M	Wh-SR	Round	3.
Frito-Lay 723	322.81	308.81	14.00	94	D	L	Wh	Round	2.
B6567-12	319.96	305.69	14.00	99	S	S	Wh-SR	Long	4.
B7629-3	315.03	283.14	31.89	94	S	S	Wh-SR	Long	4.
Wis. 718	310.36	285.47	24.89	95	S	S	Wh	Round	3.
Kennebec	309.59	290.14	19.45	90	M	M	Wh	R-long	3.
Wischip	304.14	271.47	32.67	96	S	S	Wh	Round	4.
B7152-14	283.92	256.69	27.23	98	M	D	Wh-SR	Round	4.
Wis. 707	271.47	244.24	27.23	100	M	L	Wh-SR	Round	4.
Frito-Lay 750	270.69	237.24	33.45	96	S	S	Wh-SR	Round	2.
Raratan	268.36	239.58	28.78	98	M	S	Wh-SR	Round	4.
Wis. 729R	267.58	231.80	35.78	96	M	L	Red	Round	3.
Frito-Lay 162	256.69	232.58	24.11	98	S	M	Wh-SR	Flat-long	4.
B7148-1	252.03	229.47	22.56	94	S	S	Wh-SR	Long	4.
La Rouge	251.25	217.80	33.45	98	M	M	Red	Round	4.
B7169-7	248.14	221.69	26.45	99	M	L	Pink	Round	3.
B7134-3	239.58	218.58	21.00	98	S	S	Wh	Long	4.
B7694-1	238.02	217.02	21.00	99	S	S	Wh-SR	Long	4.
Wis. 703	234.14	217.02	17.12	98	M	M	Wh-SR	R-flat	4.
Frito-Lay 630	231.80	213.13	18.67	81	M	M	Wh-SR	Round	3.
Frito-Lay 442	217.80	192.13	25.67	94	S	S	Wh	Long	4.
Seminole	213.13	199.13	14.00	100	M	M	Wh-SR	Round	4.
Lo 71-82	206.14	192.13	14.00	69	S	S	Wh-SR	Long	3.
Frito-Lay 657	205.35	195.24	10.11	80	M	M	Wh-SR	Round	3.
B7603-7	198.35	173.46	24.89	95	S	M	Pink	Round	3.
B7595-3	195.24	173.46	21.78	95	M	M	Pink	Round	3.
B7652-3	189.41	181.24	8.17	85	M	M	Red	Round	3.
Red La Soda	187.46	177.35	10.11	65	D	L	Red	Round	4.
Hi-Plains	181.24	152.46	28.78	73	S	S	Wh	R-flat	3.
B7190-2	180.85	173.46	7.39	95	M	M	Wh-SR	Round	4.
Norchip	170.34	150.13	20.21	84	D	L	Wh-SR	Round	2.
B7595-2	155.57	129.12	26.45	91	S	S	Pink	Round	3.
Superior	117.46	108.90	8.56	69	M	M	Wh-SR	Round	4.
La Chipper	88.67	79.34	9.33	40	D	L	Wh	Round	2.
Lo 71-110	53.67	49.00	4.67	26	S	S	Wh	R-flat	3.

^{1/} Size A = Potatoes with 1-7.8 inches diameter and up.
Size B = Potatoes with 1-1/2 to 1-7/8 inches diameter.

^{2/} S = shallow; M = medium depth; D = deep.

^{3/} S = small, M = medium; L = large.

^{4/} Wh = white; SR = some russet.

^{5/} 1 = poor; 5 = excellent.

Table 2. Quality and Processing Evaluations on Potato Varieties and Breeding Lines Grown at Crossville, Alabama, 1974^{1/}.

Variety	Raw tuber properties ^{2/}		Potato chip properties		Skin color
	Specific gravity	Total solids	Chip weight ^{3/}	Chip color	
	1.0 omitted	Pct.	grams	^{4/}	^{5/}
Hi-plains	837	20.97	169.7	8.3	W
Kennebec	866	21.60	173.9	8.5	W
Norchip	883	21.95	176.3	8.4	W
La Chipper	845	21.15	166.5	7.9	W
La Rouge	883	21.95	153.7	6.5	R
Raratan	900	22.20	175.6	6.5	W
Red La Soda	800	20.20	159.2	7.2	R
Seminole	900	22.30	170.8	7.5	W
Superior	851	21.28	163.5	8.8	W
Wis. 623	880	21.88	176.6	8.1	W
Wis. 703	875	21.80	176.8	6.3	W
Wis. 707	781	19.80	170.9	8.1	W
Wis. 718	864	21.58	179.9	8.2	W
Wis. 729R	820	20.83	168.6	5.3	R
Lo. 71-82	818	20.58	161.8	8.0	W
Lo 71-110	823	20.70	162.8	5.3	W
FL 162	878	21.83	177.3	8.5	W
FL 447	840	21.30	171.3	9.0	W
FL 630	820	20.65	171.0	8.0	W
FL 657	823	20.70	170.2	8.5	W
FL 723	805	20.35	168.9	9.0	W
FL 750	828	20.80	164.4	8.4	W
B6567-12	757	19.33	164.7	6.0	W
B6987-56	963	23.43	179.4	7.3	W
B7134-3	710	18.33	156.2	6.3	W
B7139-4	895	22.05	182.4	8.2	W
B7148-1	773	19.60	172.3	5.0	W
B7152-14	803	20.25	169.7	8.0	W
B7169-7R	745	19.05	158.0	8.1	R
B7190-2	827	20.77	172.9	7.5	W
B7595-2R	728	18.70	164.1	7.5	R
B7603-7R	730	18.78	162.5	8.1	R
B7629-3	880	22.15	178.1	8.0	W
B7652-3R	728	18.73	162.3	6.0	R
B7694-1	790	20.03	177.3	8.0	W
B7595-3R	780	19.78	165.5	7.5	R

^{1/} Mean of tests on samples from four randomized plots. Grown at Sand Mountain Substation, Crossville, Ala. Potatoes were dug July 18, hauled to Auburn and held at approximately 80° F. until processed which was completed within four days following digging.

^{2/} Determined by standard specific gravity method. (Vacuum oven on samples less than 8 lbs.)

^{3/} Weight of chips from 454 grams prepared slices (washed, friction peeled, trimmed, sliced 1/20", washed centrifuged, fried 2.5 to 3 min. 350° F. down to 325° F., drained).

^{4/} Based on scale of 1 as very dark and unacceptable to 6 as barley acceptable to 10 as very bright and highly acceptable.

^{5/} W means white, R means red.

Table 3. Internal Qualities of Potato Varieties Grown at Crossville, Alabama for Four Crop Years 1971-1974.

Variety	Qualities of raw tubers and processed chips by years: ^{1/}				Mean ^{2/}
	1971	1972	1973	1974	
Per cent total solids in raw tubers: ^{3/}					
Kennebec	15.1	20.3	18.5	21.6	18.88
La Chipper	16.1	20.6	17.7	21.2	18.90
Nrochip	17.5	20.9	19.6	22.0	20.00
Red La Soda	14.8	18.2	17.0	20.2	17.55
Superior	17.5	20.9	19.5	21.3	19.80
Frito-Lay 96	16.8	20.6	18.7	-	
Frito-Lay 162	-	20.6	19.4	21.8	
Wis. 623	16.1	19.7	18.3	21.9	19.00
B6516-26	18.7	22.9	21.6	-	
B6567-12	-	19.0	17.3	19.3	
B6967-9	16.0	19.6	18.3	-	
B6987-56	-	23.1	22.8	23.4	
Mean ^{2/}	16.18	20.10	18.43	21.37	19.02
Chip color evaluations: ^{4/}					
Kennebec	7.8	6.1	7.8	8.5	7.55
La Chipper	7.6	6.1	7.8	7.9	7.35
Norchip	8.4	6.8	8.8	8.4	8.10
Red La Soda	7.0	5.3	5.3	7.2	6.20
Superior	7.5	8.9	7.8	8.8	8.25
Frito-Lay 96	7.8	6.6	8.3	-	
Frito-Lay 162	-	5.3	8.5	8.5	
Wis. 623	8.4	7.0	8.5	8.1	8.00
B6516-26	8.6	6.5	9.5	-	
B6567-12	-	4.5	6.0	6.0	
B6967-9	7.3	7.0	7.3	-	
B6987-56	-	3.6	8.3	7.3	
Mean ^{2/}	7.82	6.14	7.83	7.86	

^{1/} Mean of tests on variety samples from four randomized field plots.

^{2/} Mean comparisons by varieties and years (includes only the varieties that were grown all four years).

^{3/} Standard specific gravity method.

^{4/} 1 means very dark, 6 barely acceptable, 10 very bright and highly acceptable.

ALASKA

Curtis H. Dearborn

Growing conditions were very different from the norm. Rainfall from May through August was 3.96 inches falling in 30 showers. In a 57 year record only years 1923 and 1927 had less rainfall from the same months. Overhead irrigation was used twice, the last being applied August 16. The soil was very dry at harvest in mid-September. Air temperatures were not high. Eleven days in June the temperature ranged between 70 and 78° F, 7 in July with one at 80° F, 17 in August with a high of 79° F and only two above 70° F in September with 72° F the maximum. Light measured in Langleys, (gm-cal/cm²), was the highest of any growing season for the 20 year record period.

Potato crosses made in Alaska have revealed some interesting characteristics in parental lines. Brown sunken lesions (BSL), a physiological breakdown occurring in the stolon region of tubers and associated with low availability of potassium in the soil, is a weakness seen in crosses involving clone 4221-21. In mild cases BSL is visible only in areas of the first node. Seedlings with Green Mountain x Minn 15-1 parents developed BSL all over the tubers. In the breeding for high dry matter, parental lines contributing this character are very undesirable.

Nampa appears to be carrying a factor for uniform tuber size, while Nooksack adds size and only a little skin russeting. Clone B7147-9 is the most uniform, smooth, long, oval, russet tuber observed in Alaska in 25 years. Eye arrangement is clockwise and conspicuous because of the buff colored, small, uniform, shallow eye basin. Dark russeting is complete in contrast to most russet clones.

Air checking or thumbnail check has not been a common weakness in Alaskan breeding stocks. It is a conspicuous weakness in potato segregates arising from crosses involving B-5141-6 and Nooksack. Shatter cracking is a weakness transmitted to segregates by most red skinned clones. Rode Eersteling, a yellow fleshed clone seems to be the exception. Nooksack's off-spring appear to be quite sensitive to rhizoctonia attack. Eye canker, which is common in Alaska, is accentuated in segregates of Nooksack to the loss of bud-group eyes and the formation of a corky ring around an eye that obliterates the eyebrow or leaf scar.

Last year many clones of the B-8100 series exhibited "haywire" symptoms. None of the 25 apparently clean clones that were raised in 1973 showed "haywire" appearance in 1974. Many of the 4384 first year tuber clones representing 14 pedigrees; B-8941 to B-8978, were rogued in 1974 for symptoms of rhizoctonia. It will be interesting to see if "haywire" symptoms occur in 1975 clones saved from this remaining apparently clean B8941 series.

In summarizing the B-8100 series, 2237 tubers representing 15 pedigrees have been reduced to 15 clones representing 9 pedigrees. No pedigree has more than two selections. Clones B7147-22 occurs in seven selections. B6695-1 in six, and clone B-5412-10 in three selections.

Data on characteristics of some recently imported clones grown in a single plot are presented in the table below.

Characteristics of some potato imports in 1974
compared with Snowchip.

Clone	Specific Gravity	Chip Color Rating 1-9	Tuber size Pound	Percent of Total	
				Under 2" by Count	Weight
Snowchip	1.102	2	.311	10	3
Raritan	1.102	5	.449	17	6
Targhee	1.100	3	.367	34	15
Nampa	1.097	6	.339	31	12
W-623	1.095	3	.228	40	20
Wischip	1.092	3	.214	43	25
W-729	1.088	6	.340	21	7
W-718	1.085	9	.388	22	6
W-710	1.078	5	.348	20	17

On the assumption that late blight may occur sometime in Alaska and that there might not be any Alaskan clones resistant to it, potentially resistant clones for testing were requested from Beltsville. Ten of the 20 received were retained on their horticultural merits. They are: B-7845-21, B7845-23, B-7858-6, B7865-12, B8797-1, B7935-3, B7929-3, B7957-5, B5978-1, and B-8123-12.

Second year data of high density planting of Alaska Frostless in level culture and without tillage indicates that yields on close spacing may be 75 percent higher than on conventional culture.

Replicated tests of "reds", "russets", and "whites" in 1974 involved 16, 32 and 72 clones, respectively. Alaska Red Number 5 was chosen as the best red and will be included in the North Central states regional potato variety trial. Its total yield in hundred weight per acre (cwt) in Hawaii was the highest of 20 tested at Kauai Branch Station and the highest of 17 tested at Mealani Station according to Terry Sekioka. Clone Number 5 produced 81 cwt/A more Number 1 potatoes than Chieftain the second highest yielder at Mealani.

Alaska clone 37-68-19 received the highest merit rating of all clones in the North Central regional potato trials of 1974. Its average total yield and yield of No. 1's was exceeded only by Red Pontiac. None exceeded it in percent of total solids at any location.

COLORADO

J. A. Twomey and M. Workman

Potato Seedling and Varietal Evaluation

Seedling Program. Approximately 30,000 first-year seedlings were planted May 1 and 2, 1974. Seedlings were obtained from Dr. Raymon Webb and Dr. William Hoyman from their respective breeding programs at Beltsville, Maryland, and Prosser, Washington. While the selection of russet types is the primary objective, additional emphasis was placed on selecting lines for chipping purposes.

Seedlings were harvested the first week in September. Six hundred thirty-five first-year seedlings were selected for testing in 1975. From 449 advanced seedlings grown in 1974, 43 were selected for further testing in 1975. Of the six advanced selections released to certified seed growers, three continue to show possibilities as commercial varieties. These three selections are WC285-18, WC285-146 and WC230-14.

Yield Trials. At the San Luis Valley Research Center, 14 advanced seedlings and named varieties were planted on Fall plowed alfalfa ground. Planting was done on May 8 and harvest was September 10. Each plot was two rows 30 feet long and was replicated four times. Fertilizer (18-46-0) was applied four inches below the seed at planting at the rate of 430 lbs/A. Row spacing was 34 inches with seedpieces placed 12 inches apart in the row.

Growing conditions were somewhat drier and warmer than usual from the middle of May to the middle of June. More than the normal amount of seedpiece decay was experienced at the Research Center as well as in commercial fields. The amount of seedpiece decay varied greatly between the lines being tested. Yield, grade and stand data may be found in Colorado Table 1.

Mr. Charles Urano, Weld County vegetable specialist, conducted a yield trial at Gilcrest. These results may be found in Colorado Table 2.

Colorado Table 1. Yield, Grade and Percent Stand for 1974 Variety Trial at San Luis Valley Research Center.

Yield Per Acre									
Selection	U. S. No. 1		U. S.	Culls	B Size	Total	Total	U. S.	Stand
	4-10 oz.	>10 oz.	No. 2		<4 oz.		U. S. No. 1		
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	%	%
BC7679-4	243.6	136.7	7.5	0.5	7.4	395.7	380.3	96.1	93.0
WC314-2	84.2	101.4	17.3	2.3	3.2	208.4	185.6	89.1	38.0
67-64-6*	72.0	112.7	12.8	20.9	4.5	222.9	184.7	82.9	28.0
WC325-1	155.1	40.7	24.6	1.7	9.2	231.3	195.8	84.7	90.0
WC285-18	182.6	113.8	11.1	2.1	11.2	320.8	296.4	92.4	91.0
WC316-1	150.0	93.6	11.5	0.8	4.4	260.3	243.6	93.6	87.0
WC285-146	193.3	49.4	17.3	1.1	20.1	281.2	242.7	86.3	82.0
WC285-141	143.7	127.4	16.8	3.6	5.8	297.3	271.1	91.2	87.0
Nooksack	142.3	115.7	25.8	1.4	8.8	294.0	258.0	87.8	78.0
DT6063-1R*	172.7	132.0	26.3	10.8	7.2	349.0	304.7	87.3	87.0
WC230-14	136.9	136.4	27.8	10.8	7.8	319.7	273.3	85.4	75.0
R. McClure*	289.3	17.1	46.2	19.4	20.4	392.4	306.4	78.1	83.0
R. Burbank	259.0	32.2	30.0	5.5	46.1	372.8	291.2	78.1	97.0
WC285-83	163.6	60.2	9.6	1.9	7.5	242.8	223.8	92.2	90.0
LSD	35.6	37.8	13.5	8.0	6.2	53.9			

*Red Potatoes

Colorado Table 2. Yield and Grade for 1974 Weld County Potato Variety Test Plot.
Carl Schafer Farm - Gilcrest.

Variety	Type	Yield Per Acre						
		Total	U. S.	US #1	%	U. S.	B	
		Yield	No. 1	>10 oz.	US #1	No. 2	Size	Culls
		Cwt.	Cwt.	Cwt.	%	Cwt.	Cwt.	Cwt.
ND7196-18	round white	408.6	321.8	---	78.7	10.8	65.8	10.2
Norchip	round white	373.3	327.8	---	87.9	18.0	23.8	3.8
Chieftan	red	400.7	368.4	---	91.8	17.8	12.0	2.4
67-64-2	red	213.7	190.2	---	88.8	11.4	6.4	5.6
Morgold	russet	396.0	337.6	72.4	85.1	20.4	34.0	4.0
Russet Burbank	russet	372.2	277.8	37.8	74.7	25.0	68.4	1.0
WC304-4	russet	369.5	321.2	133.4	86.8	27.0	14.8	6.8
WC285-146	russet	354.0	260.6	43.4	73.6	11.4	27.2	1.4
A6371-2	russet	347.8	262.6	47.2	75.6	34.2	47.6	3.6
WC230-14	russet	336.9	276.8	100.0	82.2	42.2	13.6	4.6
WC316-1	russet	335.0	285.6	108.4	85.4	28.2	17.4	3.8
Nampa	russet	325.8	267.6	68.6	82.2	23.8	30.6	3.8
WC314-2	russet	290.6	229.2	71.0	78.7	29.8	27.0	4.6
Targhee	russet	289.6	259.0	73.3	89.3	13.4	14.8	2.6
WC285-18	russet	257.1	190.8	15.6	74.2	13.4	52.2	1.4
Nooksak	russet	236.8	210.2	70.2	88.6	13.2	12.2	1.4

FLORIDA

J. R. Shumaker, D. P. Weingartner, James Watts, and Raymon E. Webb

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for adaptability, desirable horticultural characteristics, and resistance to tuber symptoms of corky ringspot and other diseases at the Agricultural Research Center, Hastings, Florida. Clones were grown in either advanced (four replications), intermediate (two replications), or observational (one replication) trials. In the intermediate and observational trials, standard varieties were planted so that each clone on trial was either flanked by or only two rows removed from a check. Depending on the nature of the test (Procedures, Table 1, 2, 3, 4, and 5) soil fumigation was either omitted or applied as follows. In-the-row applications of preplant Telone (8 gpa) plus broadcasted, sprayed Furadan 4F applied just after planting and incorporated in-the-row at the rate of 4 lb. ai/A.

Weather Conditions. Plants in all tests emerged rapidly due to unseasonably warm temperatures during January and most of February. Freezing temperatures which occurred on February 26 and 27 caused some plant injury. Low yield of some cultivars (e.g., Superior) and selections during 1974, when compared to their yields during previous seasons, was undoubtedly due to poor recovery following the late February freeze.

Advanced Yield and Quality Test (Table 1). Several seedling selections and cultivars produced yields of high quality tubers superior to those of the standard cultivar Sebago. Seedling B6987-56 was again outstanding, equaling or exceeding Sebago in yield and in all tuber quality ratings, and will be named in the near future.

Observational Trials (Tables 2 and 3). Based on yields and tuber appearance ratings, approximately 30 of the 92 seedlings tested showed outstanding promise.

Advanced Corky Ringspot (CRS) and Disease Resistance Evaluation (Table 4). Incidence and severity of CRS (caused by tobacco rattle virus) was moderate to severe and incidence of both tuber galling caused by the southern root-knot nematode (*Meloidogyne incognita*) and tuber brown rot (*Pseudomonas solanacearum*) were low in the test area. Based on the percent tubers with internal necrosis associated with CRS, the cultivars Green Mountain, Hudson, Superior, and Pungo and the seedlings B6951-1, B6969-2, B7153-29, B7152-1, and B7200-26 were free of CRS. This was the third year that B7152-1 and Green Mountain and the second year that B6951-1 have developed no CRS symptoms when the disease has been moderate to severe in susceptible cultivars.

Intermediate Corky Ringspot and Disease Resistance Trial (Table 5). Five of 31 clones illustrated 0-3% internal necrosis associated with CRS.

Florida Table 1. Results from 25 clones selected for advance yield and quality testing at Hastings, Florida -- 1974.

Clone	Yield		Ratings ^{1/}							Specific gravity
	Size "A"	Total	Plant emergence	Earliness	Vine type	Tuber appearance	Tuber brightness	Tuber brown rot	Chip color ^{2/}	
		cwt/acre								
B6987-29	288a3/	294a	4.5ef	6.3a-d	7.0a-c	5.5e-g	6.3c-g	9.0a	1.6	1.0743
B6987-56	280a	289a	3.5fg	6.5a-d	6.5a-d	6.5b-f	5.0g	9.0a	2.2	1.0880
Hudson	262ab	271ab	2.3g-i	4.3ef	8.0a	4.8g	6.0d-g	8.8a	2.6	1.0744
B7151-4	251a-c	263a-c	3.5fg	3.3f	7.8ab	5.3fg	5.5e-g	9.0a	2.0	1.0798
B7629-1	248a-d	256a-d	1.0i	6.5a-d	6.0b-d	4.8g	6.0d-g	9.0a	3.4	1.0675
LaChipper	227b-e	235b-e	3.0gh	7.0a-d	6.0b-d	6.3c-g	6.8a-e	9.0a	2.0	1.0723
Sebago	219b-f	233b-f	6.3a-d	5.8c-e	7.8ab	6.3c-g	7.0a-d	9.0a	3.0	1.0656
B7200-26	208c-g	219c-g	3.0gh	6.5a-d	5.5cd	6.3c-g	7.8ab	9.0a	2.4	1.0702
B7152-12	206c-g	218c-g	1.3i	5.8c-e	6.5a-d	7.8a-c	7.8ab	9.0a	3.2	1.0702
Penn 71	209c-g	215c-g	3.3f-h	5.3de	6.0b-d	5.8e-g	7.3a-d	9.0a	2.0	1.0692
B6955-35	199c-g	217c-g	6.5a-c	6.5a-d	6.8a-d	6.0e-g	6.5b-f	9.0a	1.8	1.0702
Cascade	198c-g	212c-g	5.0de	7.5a-c	5.8cd	7.3a-d	6.5b-f	8.3a	4.4	1.0701
B7592-1	192e-g	211c-g	5.0de	6.3a-d	4.8d	6.8b-f	6.0d-g	8.3a	2.4	1.0720
B5141-6	196d-g	208d-g	5.5c-e	6.5a-d	5.0cd	6.3c-g	6.0d-g	9.0a	1.8	1.0834
Seminole	197d-g	206d-g	5.0de	6.5a-d	5.5cd	6.0e-g	6.3c-g	7.8a	4.2	1.0840
Norchip	186e-g	206d-g	7.3a	7.8ab	6.8a-d	6.8b-f	7.5a-c	8.5a	2.0	1.0747
Wauseon	189e-g	199e-g	4.5ef	7.3a-c	6.3a-d	6.3c-g	6.0d-g	9.0a	2.4	1.0635
B6987-22	181e-g	199e-g	6.5a-c	6.8a-d	6.3a-d	8.0ab	5.5e-g	9.0a	1.8	1.0769
B7153-29	178e-g	193e-g	3.5fg	6.0b-e	5.0cd	6.3c-g	6.0d-g	8.5a	1.6	1.0697
Pungo	185e-g	192e-g	7.0ab	8.0a	5.5cd	5.3fg	5.3fg	8.5a	2.8	1.0676
B7152-1	177e-g	189e-g	2.0hi	6.0b-e	4.8d	6.8b-f	7.0a-d	9.0a	2.0	1.0724
B7828-9	167f-h	183e-h	5.0de	6.8a-d	6.5a-d	6.5b-f	6.5b-f	9.0a	3.0	1.0702
B7680-3	156gh	180f-h	6.3a-d	7.8ab	5.0cd	7.0a-e	6.0d-g	9.0a	3.6	1.0698
B8019-7	154gh	167gh	5.5c-e	6.5a-d	4.8d	8.5a	8.0a	8.3a	2.4	1.0702
Superior	122h	139h	5.8b-e	6.0b-e	6.3a-d	8.0ab	5.3fg	9.0a	3.2	1.0737

1/ From 9.0=earliest, best, desirable, or none to 0.0=latest, worse, undesirable or most severe (100%).

2/ Chip color 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use. Mean of 5 determinations.

3/ Column means not having letter in common are significantly different at the 5% level.

PROCEDURES: Soil fumigation = 8 gpa preplant Telone + 4 lb. ai/A Furadan in-the-row at planting. Replications = 4. Plots = 20 hill units (20ft.). Planted = 1/29/74. Harvested = 5/21/74.

Florida Table 2. Results from 71 seedling and two standard varieties selected for observational yield and quality testing at Hastings, Florida -- 1974.

Clone 2/	Yield		Plant emergence	Earliness	Vine type	Ratings 1/			Brown rot	Second growth	Chip Color 3/	Specific gravity
	Size "A"	Total cwt/acre				Appearance	Brightness	Tuber Growth				
B6930-6	199	214	4.0	4.5	5.0	6.5	7.0	9.0	9.0	8.0	3.4	1.0679
B6951-5	165	174	5.0	7.5	4.0	7.5	7.0	8.5	9.0	9.0	2.6	1.0699
B6955-3	214	227	3.0	6.0	2.0	6.0	5.5	9.0	9.0	9.0	2.8	1.0721
B7009-4	283	291	3.0	5.0	6.0	8.0	6.5	9.0	9.0	9.0	5.2	1.0647
B7024-17	289	293	1.0	1.0	8.5	6.0	4.5	9.0	9.0	9.0	4.2	1.0681
BR7051-3	237	252	4.0	6.0	7.0	7.0	5.5	9.0	9.0	9.0	2.0	1.0835
B7141-1	176	193	1.0	1.0	5.0	6.5	6.5	9.0	9.0	9.0	3.0	1.0816
B7164-25	316	323	5.5	6.0	8.0	7.5	5.0	9.0	9.0	9.0	3.0	1.0692
B7167-2	169	183	6.5	8.0	3.5	8.0	7.5	9.0	9.0	9.0	2.2	1.0781
B7573-3	161	172	4.0	7.0	2.5	4.5	7.5	9.0	9.0	9.0	1.6	1.0713
B7590-6	155	176	2.0	6.5	4.5	7.0	7.5	9.0	9.0	9.0	1.8	1.0635
B7595-7	261	280	3.0	4.0	7.0	6.0	6.5	9.0	9.0	9.0	3.2	1.0702
B7610-1	322	330	5.0	4.5	8.5	5.5	4.0	9.0	9.0	9.0	1.6	1.0812
B7618-6	244	256	2.0	4.5	7.0	5.5	5.5	9.0	9.0	9.0	2.8	1.0633
B7620-4	298	308	7.0	6.0	8.5	6.0	6.0	8.5	9.0	9.0	4.8	1.0690
B7642-2	195	201	3.5	6.5	4.5	7.5	7.0	8.5	9.0	9.0	3.2	1.0691
B7650-19	264	271	1.0	5.0	3.5	2.5	7.0	8.0	9.0	7.0	2.8	1.0602
B7669-2	161	180	0.0	4.0	4.0	4.5	7.0	9.0	9.0	9.0	4.6	1.0587
B7825-5	189	214	4.0	4.5	4.5	6.0	6.0	9.0	9.0	9.0	2.2	1.0658
B7832-2	169	183	4.5	6.5	4.5	7.5	6.0	9.0	9.0	9.0	2.2	1.0690
B7839-7	207	223	8.0	7.5	6.0	7.0	7.5	9.0	9.0	9.0	3.0	1.0566
B7845-23	308	320	3.5	5.5	7.0	6.5	7.5	9.0	9.0	9.0	2.6	1.0688
B7845-26	267	280	3.0	5.0	5.5	5.5	6.0	9.0	9.0	9.0	4.0	1.0635
B7853-2	194	217	5.0	6.5	6.5	3.5	6.0	9.0	9.0	6.0	4.0	1.0653
B7858-5	276	294	3.0	1.5	8.0	5.0	6.0	9.0	9.0	9.0	4.8	1.0678
B7863-1	242	248	4.0	5.0	7.0	6.5	6.0	9.0	9.0	9.0	3.0	1.0744
B7863-5	246	254	2.0	4.0	7.5	6.5	5.0	9.0	9.0	9.0	3.6	1.0664
B7863-6	206	212	3.0	6.0	4.0	5.0	6.0	9.0	9.0	9.0	2.8	1.0665
B7865-12	285	314	6.0	6.5	9.0	7.0	6.5	9.0	9.0	9.0	5.4	1.0610
B7866-3	286	291	0.5	1.0	8.0	7.5	7.0	9.0	9.0	9.0	2.8	1.0631

Florida Table 2. (Continued)

Clone ^{2/}	Yield		Plant emergence	Earliness	Vine type	Ratings ^{1/}			Brown rot	Second growth	Chip Color ^{3/}	Specific gravity
	Size "A"	Total				Appear- ance	Bright- ness	Tuber Growth crack				
		cwt/acre										
B7871-3	328	340	5.5	3.5	7.0	3.5	6.5	9.0	9.0	6.5	3.2	1.0588
B7871-5	206	215	4.5	7.0	4.0	6.5	6.0	8.0	9.0	9.0	2.2	1.0667
B7872-7	190	197	3.0	7.0	4.0	7.5	5.5	9.0	9.0	9.0	3.4	1.0644
B7881-3	140	172	2.5	1.0	8.5	6.0	7.0	9.0	9.0	9.0	3.0	1.0635
B7888-7	205	236	4.0	5.5	6.0	5.0	5.0	9.0	9.0	9.0	2.4	1.0599
B7888-8	231	237	1.0	6.0	5.0	5.5	7.0	9.0	9.0	9.0	2.0	1.0698
B7888-9	248	271	5.0	4.5	6.5	5.0	5.5	7.5	9.0	9.0	2.4	1.0702
B7901-5	228	248	4.0	6.0	6.0	4.5	5.5	9.0	9.0	7.5	4.4	1.0719
B7903-1	127	144	5.5	7.0	1.0	6.5	7.5	9.0	9.0	8.5	1.6	1.0687
B7905-2	203	218	3.5	6.0	6.5	6.0	5.5	9.0	9.0	9.0	3.2	1.0633
B7910A-6	217	238	2.0	2.5	8.0	4.5	5.5	9.0	9.0	8.0	5.0	1.0567
B7910A-7	252	263	1.5	5.0	5.0	5.0	5.5	7.0	9.0	9.0	2.6	1.0613
B7910A-11	248	265	2.5	6.5	6.5	6.5	6.0	9.0	9.0	9.0	3.6	1.0642
B7913-1	261	276	4.5	5.0	7.0	3.5	7.0	8.0	9.0	9.0	5.0	1.0611
B7914-2	231	236	1.5	4.5	4.5	6.5	7.0	9.0	9.0	8.5	2.6	1.0766
B7925-3	178	193	1.0	2.0	2.5	6.5	7.0	9.0	9.0	9.0	2.0	1.0745
B7929-5	136	174	4.0	6.5	3.5	5.5	5.0	9.0	9.0	9.0	3.0	1.0823
B7929-8	176	199	5.5	6.5	4.5	7.5	5.5	9.0	9.0	9.0	3.2	1.0711
B7930-2	207	235	6.5	7.0	7.0	7.5	5.5	9.0	9.0	9.0	2.4	1.0709
B7939-4	263	282	5.0	7.0	7.5	4.5	6.0	9.0	9.0	8.5	3.0	1.0669
B7957-5	258	291	4.0	4.0	7.5	6.5	6.5	9.0	9.0	9.0	1.8	1.0723
B7990-1	242	250	4.5	4.5	5.0	5.0	6.0	9.0	9.0	8.0	3.8	1.0698
B8004-1	206	216	3.0	5.5	6.0	4.5	6.5	5.0	8.5	9.0	5.6	1.0600
B8004-8	274	289	6.5	5.5	7.5	6.0	6.0	8.5	9.0	9.0	3.4	1.0590
B8017-6	235	249	1.5	2.0	3.5	8.0	7.5	9.0	9.0	9.0	3.0	1.0675
B8017-7	176	203	6.5	7.0	5.0	7.0	5.5	9.0	9.0	9.0	3.0	1.0679
B8018-2	169	201	4.0	6.0	4.5	5.0	6.0	7.0	9.0	9.0	3.4	1.0635
B8018-3	301	323	3.5	3.5	7.0	4.5	7.0	6.0	9.0	8.0	5.0	1.0611
B8019-4	207	212	1.5	5.0	3.5	6.5	7.5	9.0	9.0	7.5	4.4	1.0686
B8036-1	216	232	4.5	3.5	5.5	5.0	5.0	9.0	9.0	9.0	2.8	1.0691
B8036-3	250	282	6.5	1.5	9.0	3.5	5.0	9.0	9.0	9.0	3.2	1.0646
B8036-4	303	317	5.5	5.5	6.5	7.0	6.0	9.0	9.0	9.0	2.8	1.0624
B8050-1	225	239	2.5	6.5	5.5	8.0	7.0	9.0	9.0	9.0	3.2	1.0643

Clone ^{2/}	Yield		Ratings ^{1/}					Chip Color ^{3/} /gravity		
	Size "A"	Total	Plant emer- gence	Earl- ness	Vine type	Tuber				
						Appear- ance	Bright- ness		Growth crack	Brown rot
	cwt/acre									
B8070-7	294	299	4.0	6.0	7.0	7.0	6.0	9.0	9.0	8.5
B8073-3	296	306	3.0	5.0	4.5	8.0	6.0	9.0	9.0	9.0
B8087-6	228	233	3.5	6.0	3.5	7.0	6.5	9.0	9.0	9.0
B8101-3	261	274	2.5	3.0	6.5	6.0	6.0	9.0	9.0	8.0
B8113-12	269	304	1.0	2.5	6.5	7.0	8.0	9.0	9.0	9.0
B8125-5	206	231	4.5	5.5	7.0	7.0	6.5	9.0	9.0	9.0
B8148-4	231	251	2.5	4.5	7.0	5.5	7.0	8.5	9.0	9.0
B8154-9	205	227	2.5	6.5	5.0	5.5	7.5	9.0	9.0	9.0
Sebago	243	258	7.7	5.3	7.4	6.7	7.5	9.0	9.0	8.9
Pungo	229	237	8.4	7.3	6.1	5.4	5.6	9.0	9.0	9.0

^{1/} From 9.0 = earliest, best, desirable, or none to 0.0 = latest, worse, undesirable or most severe (100%).

^{2/} Each seedling replicated 2 times, each check variety (Sebago and Pungo) replicated 19 times.

^{3/} Chip color 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use. Mean of 5 determinations.

PROCEDURES: Soil fumigation in-the-row = 8 gpa preplant Telone + 4 lb. ai/A Furadan. Plots = 20 hill units (20 ft.). Planted = 1/29/74. Harvested = 5/21-22/74.

Florida Table 3. Results from 21 seedlings and standard varieties selected for observational yield and quality testing at Hastings, Florida -- 1974.

Clone2/	Yield		Ratings1/					Chip color3/	Specific gravity
	Size "A"	Total	Plant emer- gence	Earl- iness	Vine type	Tuber appear- ance	Tuber bright- ness		
		cwt/acre							
B7516-2	125	126	3	5	1	3	6	4.4	1.0636
B7516-7	289	295	2	6	7	6	6	2.2	1.0699
B7516-11	286	287	4	6	6	6	6	2.0	1.0655
B7584-13	349	359	4	5	8	8	6	2.4	1.0721
B7602-12	252	277	7	6	7	7	7	2.8	1.0747
B7633-6	182	200	4	6	4	5	5	2.4	1.0677
B7783-8	217	265	4	6	7	4	5	2.2	1.0759
B7828-8	293	299	2	5	7	6	6	3.6	1.0743
B7828-13	250	268	4	6	6	6	7	2.8	1.0724
B7862-3	222	235	4	7	6	8	8	4.7	1.0624
B7891-3	295	315	1	2	8	6	6	3.2	1.0708
B7902-4	223	235	7	8	4	7	8	3.8	1.0644
B8185-4	247	274	3	5	5	6	6	5.2	1.0644
B8206-2	149	172	6	8	3	6	7	3.4	1.0723
B8224-2	287	293	7	5	7	5	6	4.0	1.0837
B8229-1	302	311	1	2	5	4	7	6.8	1.0546
B8280-8	280	331	5	6	9	4	3	3.8	1.0634
B8302-1	338	352	6	7	8	7	8	6.2	1.0600
B8306-3	308	312	2	1	9	6	6	2.0	1.0837
B8357-1	205	220	0	5	5	5	4	2.6	1.0719
B8375-2	106	157	6	9	2	5	6	3.2	1.0576
Sebago	264	274	7	5	7	6	7	2.0	1.0643
Pungo	276	281	8	7	6	6	6	2.2	1.0658

- 1/ From 9.0=earliest, best, desirable, or none to 0.0=latest, worse, undesirable or most severe (100%).
2/ Each check (Sebago and Pungo) variety=the mean of 3 plots; remaining seedlings=single observational plot.
3/ Chip color: 1-4=acceptable; 5=borderline; 6-9=too dark for use. Mean of 5 determinations.
PROCEDURES: Soil fumigation in-the-row=8 gpa preplant Telone + 4 lb. ai/A Furadan at planting. Plots=10 hill units (10 ft.). Planted = 1/29/74. Harvested = 5/21 - 22/74.

Florida Table 4. Yield, plant emergence, tuber quality and disease results from 20 clones selected for advanced corky ringspot (CRS) disease testing at Hastings, Florida -- 1974.

Clone	Yield		Ratings ^{1/}					Tubers ^{2/}	
	Size	"A" Total	Plant emergence	Tuber appearance	Tuber root-knot gall	Tuber brown rot	Tuber external (CRS)	Internal necrosis severity (CRS)	with internal necrosis (CRS)
	cwt/acre								%
B7629-1	263a ^{3/}	268a	3.3g	6.3c-e	9.0a	9.0a	8.8a	8.0a	2.5f
B7151-4	205b	219ab	6.3a	5.3d-f	9.0a	9.0a	8.5a	6.0b	41.7ab
B6987-56	201bc	210bc	5.8a-c	6.5b-d	9.0a	9.0a	9.0a	6.5b	11.9ef
Mohawk	168b-d	174b-d	4.5c-g	3.8gh	9.0a	9.0a	7.0b	6.0b	38.7a-c
Hudson	167b-d	171b-d	5.8a-c	5.3d-f	8.5a	8.8ab	9.0a	9.0a	0.0f
B7807-2	153b-e	163b-e	5.3a-e	8.5a	7.3a-c	8.8ab	7.0b	6.5b	15.0d-f
B6951-1	152b-e	164b-e	6.0ab	7.5a-c	9.0a	9.0a	9.0a	9.0a	0.0f
B6969-2	148c-e	155c-f	4.5c-g	8.0a	9.0a	9.0a	8.8a	9.0a	0.0f
Wauseon	140d-f	149d-f	5.8a-c	5.0e-g	8.8a	8.8ab	8.8a	6.8b	25.0c-e
B7153-29	135d-f	149d-f	4.3fg	6.0de	8.8a	9.0a	8.8a	9.0a	0.0f
B7608-2	130d-f	146d-f	4.8b-f	7.8ab	9.0a	9.0a	8.3ab	4.5c	39.1a-c
Sebago	133d-f	145d-f	6.0ab	4.3f-h	6.0c	9.0a	4.8c	5.5bc	50.0a
B7152-1	129d-f	140d-g	3.8fg	7.8ab	8.8a	9.0a	9.0a	9.0a	0.0f
B7200-26	124d-g	133d-g	5.0a-f	5.5d-f	9.0a	9.0a	9.0a	9.0a	0.0f
B7152-12	123d-g	132d-g	0.8h	5.5d-f	9.0a	9.0a	8.0ab	5.5bc	28.0b-d
Penn 71	118d-g	124d-g	4.0fg	3.8gh	9.0a	9.0a	8.0ab	5.5bc	32.9bc
Pungo	101e-g	109e-g	6.0ab	5.5d-f	7.8ab	9.0a	9.0a	9.0a	0.0f
B7592-1	100e-g	118d-g	5.5a-d	5.0e-g	9.0a	9.0a	8.0ab	6.3b	25.5c-e
Green Mtn.	87fg	102fg	6.3a	3.3h	7.8ab	9.0a	9.0a	9.0a	0.0f
Superior	69g	86g	5.0a-f	6.5b-d	6.8bc	8.5b	9.0a	9.0a	0.0f

1/ From 9.0 = earliest, best, desirable, or none to 0.0 = latest, undesirable, worse, or most severe (100%).

2/ Sixteen to twenty randomly selected tubers from each plot were scored.

3/ Column means not having letter in common are significantly different at the 5% level.

PROCEDURES: Replications = 4. Plots = (20 hill units) = 20 ft. Planted = 1/25/74. Harvested = 5/20/74.

Florida Table 5. Yield, plant emergence, tuber quality, and disease results from 31 clones selected for intermediate corky ringspot (CRS) testing at Hastings, Florida -- 1974.

Clone ^{2/}	Yield		Ratings ^{1/}					Tubers ^{3/} with inter- nal necrosis (CRS)	
	Size "A"	Total	Plant emer- gence	Tuber appear- ance	Tuber root- knot gall	Tuber brown rot	Tuber exter- nal (CRS)		Tuber ^{3/} internal necrosis severity (CRS)
		cwt/acre							%
B6987-1	176	186	6.5	4.5	8.0	9.0	7.5	7.0	18.6
B6987-22	120	139	5.5	6.0	9.0	9.0	7.5	5.0	37.5
B6987-29	197	208	6.5	3.5	7.0	9.0	7.5	6.0	40.0
B6987-43	106	120	5.5	4.5	8.5	9.0	5.0	5.0	28.0
B6987-54	165	174	7.5	7.0	8.5	9.0	8.0	7.0	15.0
B6987-56	256	268	5.5	6.5	7.5	9.0	8.5	4.5	37.5
B6987-57	233	242	4.5	5.5	9.0	7.5	7.5	7.0	16.7
B7151-4	191	210	6.0	3.5	8.5	7.5	7.5	5.0	22.5
B7152-1	184	195	4.5	6.5	8.0	9.0	9.0	8.5	2.5
B7152-3	71	91	4.5	5.5	9.0	9.0	6.5	6.5	26.9
B7152-12	161	173	3.0	5.5	8.5	9.0	7.0	8.5	2.8
B7152-14	166	174	1.5	5.0	9.0	9.0	7.0	6.5	5.6
B7153-29	138	152	5.0	6.5	7.5	9.0	9.0	9.0	0.0
B7154-6	178	191	5.0	7.5	8.5	7.5	9.0	8.0	2.5
B7154-10	181	188	4.5	6.0	9.0	9.0	9.0	3.5	15.5
B7155-51	110	124	7.0	7.5	8.5	9.0	7.0	7.5	15.5
B7592-1	147	172	5.5	6.0	8.0	9.0	7.5	6.0	17.6
B7608-2	112	130	4.5	7.5	9.0	9.0	8.5	5.0	25.0
B7608-4	172	180	5.0	3.0	8.5	9.0	5.5	5.5	25.0
B7649-5	146	154	5.0	6.5	9.0	9.0	9.0	7.0	17.5
B7654-12	129	154	6.0	4.5	6.5	9.0	5.5	4.0	33.3
B7663-3	114	130	7.0	8.0	8.5	9.0	9.0	6.5	16.7
B7680-6	81	105	5.0	2.0	8.5	9.0	6.5	4.5	27.3
B7744-4	131	138	5.0	7.0	9.0	9.0	9.0	9.0	0.0
B7805-1	125	137	5.5	6.5	9.0	9.0	8.5	5.5	22.5
B7807-2	157	166	7.0	8.5	8.5	8.0	6.0	7.5	11.7
Hudson	223	230	7.5	4.5	7.5	8.0	9.0	9.0	0.0
Penn 71	149	157	5.5	3.5	8.0	6.5	5.5	6.0	26.6

Florida Table 5. (Continued)

Clone ^{2/}	Yield		Ratings ^{1/}						Tubers ^{3/} with inter- nal necrosis (CRS)
	Size "A"	Total	Plant emer- gence	Tuber appear- ance	Tuber root- knot gall	Tuber brown rot	Tuber exter- nal (CRS)	Tuber ^{3/} internal necrosis severity (CRS)	
	cwt/acre								\bar{x}
Pungo	120	129	6.6	4.9	5.9	9.0	9.0	9.0	0.0
Sebago	114	127	6.3	3.4	5.0	9.0	3.7	3.7	55.2
Wauseon	145	156	6.0	5.8	8.3	8.8	7.4	6.3	36.1

- 1/ From 9.0 = earliest, best, desirable, or none to 0.0 = latest, worse, undesirable, or most severe (100%).
 2/ Each check variety (Sebago, Pungo, and Wauseon) = mean of 3 plots; each remaining clone = mean of 2 plots.
 3/ Sixteen to twenty randomly selected tubers from each plot were scored.

PROCEDURES: Soil fumigation = none. Plots = 20 hill unit (20 ft.). Planted = 1/25/74. Harvested = 5/21/74.

PACIFIC NORTHWEST (IDAHO & OREGON)

J. J. Pavék and D. R. Douglas

Greenhouse

Fifty-five superior S. tuberosum selections (mostly oblong or long russets) and 21 S. tuberosum cultivars were intercrossed in 582 combinations averaging 2100 seeds per cross. Thirty-three andigena clones and hybrids were intercrossed in 138 combinations averaging 1450 seeds per cross. Sixteen diploids, generally having superior internal quality, were crossed in 76 combinations averaging 2800 seeds per cross.

Very hot weather during the June transplanting resulted in about 50% mortality in transplanted seedlings. Consequently only about 24,000 seedling tubers were produced in 246 families. Ninety-two latent-virus free lots of seed tubers were indexed for leafroll in April.

Field

Weather. Maximum temperatures in June in eastern Oregon and southern Idaho averaged 4° above normal, and during the remainder of the growing period they were near or slightly below normal. The high temperatures early in the season resulted in considerable hollow-heart and some tuber malformations. Also, the Verticillium wilt appeared to be more severe than usual.

Cooperators. Advanced and intermediate selections were evaluated at two locations in California, four in Oregon, one in Washington, and eight in Idaho. Eight of the most advanced selections were evaluated in yield trials conducted by University of Idaho Extension Specialists. These and other advanced clones are also being evaluated by processor researchers for yield and quality. Data from most of these locations are not yet available (as of Jan. 30).

Three hundred five families of single-hills were grown in scab and Verticillium infested fields at Aberdeen; 1690 were selected. From 1051 12-hill plots, 314 were selected for further testing.

Six yield trials (advanced, intermediate, preliminary, early and late) were conducted at Aberdeen with 189 selections and four checks. Forty advanced and intermediate selections were tested for adaptation, yield, and quality in yield trials at the Malheur Experiment Station, Ontario, Oregon by Charles Stanger, Niel Hoffman, and industry cooperators.

The Aberdeen trials were planted during the first three weeks of May at a 10-inch spacing in 36-inch rows in a silt loam soil. A RCB design was used for the yield trials. Two hundred fifty pounds of nitrogen and 100 pounds phosphate were applied in bands at planting; the rates were determined by use of soil analyses. Twenty pounds of 15% granular Di-Syston was also applied at planting. Eptam was applied for weed control. Thiodan and Metasystox-R were applied once in August to control aphids. Water was applied in furrows as needed except that in the

early blight trials, it was applied with sprinklers. The vines were beaten off a day prior to harvest of the early maturity plots, and frost killed the plants in the other trials on September 14.

The advanced yield trial results are presented in P.N.W. Table 1. Six of the 23 selections yielded significantly more than the Russet Burbank standard; only one yielded significantly less. More than half of these advanced selections performed well enough for use in commercial french fry production.

The results obtained with 21 advanced selections in the Early Harvest Yield Trials at Malheur and Aberdeen Stations is presented in P.N.W. Table 2. Generally the relative performance of the various clones was similar at the two locations; however, NDA 8451-3 was the top one at Malheur and at the bottom at Aberdeen. NDA8451-3 and A6680-5 had attractive tubers at both locations.

Disease Evaluations

Separate trials were conducted for each of the following: Verticillium wilt, early blight, scab, leafroll net necrosis, and corky ringspot (Tobacco Rattle Virus). The data for all of these are presented in P.N.W. Table 3. Not all of the clones listed were evaluated in each disease trial in 1974. The reason for this is that the clones were either evaluated at an earlier date or there was not adequate seed to be planted in every trial. Clones possessing high degrees of resistance to one or more of the listed diseases are available in our present breeding program.

Distribution

A summary of the distribution of selections, named varieties, and seedling tubers is presented in P.N.W. Table 4.

P.N.W. Table 1. Advanced Yield Trial, Aberdeen, Idaho (Four replications of 20 hills)^{1/}

Clones	Total Tuber Yield cwt/A	Percent of Total Yield				Specific ^{2/} Gravity	French ^{3/} Fry Color	Tuber ^{4/}	
		US No. 1			Shape			Russetting	
		Total	Over 10 Oz	Under 6-10 Oz					Under 4 Oz
A68113-4	460	83	37	36	5	93	0.8	L-0	Lt (White)
A69657-4	409	89	45	33	7	93	1.0	0	M
A67490-2	377	83	23	39	13	88	2.6	0	M
A66102-13	375	83	15	41	13	96	0.9	0	M
A68233-6	344	83	30	39	10	82	0.5	0	Lt+
A66107-207	344	89	30	43	10	89	1.0	0	M
A68683-14	321	85	43	32	3	89	1.0	0-L	Lt
A66107-44	316	82	15	40	17	92	1.1	0	Lt+
A6830-3	307	85	23	35	13	96	2.0	0-L	Lt.fl.
A66107-107	306	82	29	44	9	96	1.3	0	Lt+
A5400-15	306	83	19	44	10	91	1.1	L-0	(White)
A67524-1	300	97	60	31	2	75	1.7	0-L	(Red)
A68709-2	299	81	17	41	17	90	0.5	0	M.Hv.
A68683-7	286	79	27	35	10	81	1.0	0-L	M
Russet Burbank	273	81	20	40	12	85	1.1	L	M
A67490-3	263	73	6	39	26	94	1.3	0	M+
A67315-7	249	85	23	41	14	93	1.8	0	M
A68294-2	241	75	18	37	21	78	1.3	0	M.Hv.
A68686-22	236	67	7	32	22	83	1.2	VL	M+
A6721-16	232	64	13	38	8	87	1.1	0	M+
A68681-1	224	68	14	38	14	81	1.0	0-L	M+
A68683-4	221	83	33	37	10	88	0.8	0-L	M
A66110-23	214	85	30	37	12	82	2.6	L-0	M.Hv.
A6789-7	201	88	23	43	11	83	1.8	0	(White)
Mean	296	82	26	39	12	88	1.3		
LSD ₀₅	62					.002	0.6		

^{1/} Planted May 15, harvested September 26, 1974.

^{2/} 1.0 omitted.

^{3/} 1.0 (lightest) to 5.0 (darkest); in storage two months at 45°F; mean of four reps of three tubers.

^{4/} 0 = oblong, L = long, 0-L = oblong-long, etc., Lt = light, M = medium, Hv = heavy, f1 = flakey.

P.N.W. Table 2. Advanced Early Harvest Yield Trial (Four replications of 20 hills each location except as noted).

Clones	MALHEUR STATION (OREGON) ^{1/}						ABERDEEN STATION (IDAHO) ^{2/}					
	Total			US No. 1			Total			US No. 1		
	Tuber			Over			Tuber			Over		
	Yield	All	%	10 Oz	6-10 Oz	%	Yield	All	%	10 Oz	6-10 Oz	%
NDA8451-3	483	86		37	31		203	73		10	30	
NDA8694-3	482	91		38	33		233	67		6	36	
NDA7697-2	448	90		32	37		302	86		31	40	
Hi-Plains	435	73		9	29		301	81		15	36	
A66110-7	425	84		19	41		259	84		15	45	
Pioneer	417	82		16	32		290	84		19	39	
A6680-5	416	85		15	38		236	84		16	37	
Norgold Russet	397	88		24	42		220	74		8	29	
A67284-5	392	75		16	32		271	76		11	36	
A68730-7	386	69		5	28		259	71		6	33	
NDA7698-1	377	79		15	35		208	79		6	41	
A66107-12	373	71		9	29		235	79		14	35	
A68588-16 ^{4/}	461	92		41	46		248	80		21	38	
A6673-1	441	83		9	49		310	72		16	30	
A6802-9	424	72		6	39		300	56		3	26	
A68710-5	421	91		20	54		252	86		22	42	
A68587-3	416	73		10	34		252	62		18	23	
A68599-1	404	87		20	42		199	76		12	30	
A68704-4	403	81		17	42		229	74		10	33	
A68683-13	393	79		15	42		243	75		13	31	
A6802-3	389	88		32	45		227	70		15	32	
A66107-197	355	86		25	44		217	82		14	34	
A66107-182	352	57		2	29		217	53		6	16	
A68684-5	336	78		11	49		233	79		11	36	
Mean	403	81		19	38		248	75		13	34	
LSD ₀₅							41					
												1.3

1/ Planted April 15-18, harvested August 12; data supplied by Charles Stanger.

2/ Planted May 1, harvested August 13.

3/ See appropriate P.N.W. Table 1 footnotes; french fried two days after harvest.

4/ This and lower listed clones replicated three times at Malheur Station.

P.N.W. Table 3. Disease Evaluations

Clonal Designation	Maturity ^{1/}	Vert Wilt ^{2/}	Scab ^{3/}	E. Blgt ^{4/} Foliage	E. Blt ^{5/} Tuber	Leafroll Net Necrosis ^{6/}	Corky Ringspot ^{7/}
Russet Burbank (X Free)	3.0	3.6	1.1				
Russet Burbank (X & S Free)	2.9	4.5	1.1				
Russet Burbank (Regular)	2.9	4.5	1.1				
Nampa	2.6	4.4	1.0				
Targhee	3.0	2.3	1.0				
A63126-9	3.0	2.7	1.2				2.8
A6371-2	3.0	3.5	1.0				2.8
A64206-4	3.5	.4	1.0				
A66119-7	3.1	2.3	1.0				
A66122-3	3.1	1.2	1.0				
A66122-4	2.9	3.1	1.0	1.8	1.6		2.4
A68678-1	2.7	3.2	1.2	2.6	.64		2.1
A66102-16	3.0	2.4	1.3				2.0
A66107-51	3.8	.5	1.0				2.6
A5400-15	2.9	3.9	1.5P	2.9	.41		1.4
A66102-13	3.2	1.5	1.2	2.0	1.3		
A66107-44	2.9	1.4	1.1	1.8	1.1		
A66107-107	3.4	1.1	1.2	2.4	.76		
A66107-207	2.9	3.6	1.1	1.4	2.1		
A66110-23	3.0	4.4	1.0	2.5	1.1		
A6789-7	3.1	1.1	1.5	2.2	1.0		
A67315-7	3.2	.8	1.1	1.9	.46		1.3
A67490-2	3.3	.8	1.1	1.5	1.3		
A67490-3	2.9	2.8	1.0	2.4	3.4	10	
A6830-3	3.1	1.4	1.1	2.3	2.1	4	
A68294-2	3.1	3.4	1.3	2.3	.47	24	
A6721-16	3.1	3.6	1.0	2.7	1.7		
A67524-1	3.4	.5	1.1	2.3	.27	34	1.4
A68113-4	3.3	.3	2.8P	1.6	1.0		
A68233-6	2.9	3.0	1.1	3.1	1.0		

P.N.W. Table 3. Disease Evaluations (continued page 2)

Clonal Designation	Maturity ^{1/}	Vert ^{2/} Wilt	Scab ^{3/}	E. Blt ^{4/} Foliage	E. Blt ^{5/} Tuber	Leafroll Net Necrosis ^{6/}	Corky Ringspot ^{7/}
A68681-1	2.8	1.9	1.0	1.9	1.6		
A68683-4	2.4	4.0	1.0	2.5	.37		
A68683-7	2.7	4.1	1.0	2.4	.71		
A68683-14	3.1	3.8	1.4P	2.6	.91		
A68686-22	3.1	3.8	1.1	2.7	.24	28	
A68709-2	2.4	2.8	1.1	3.2	.33		
A69657-4	2.8	3.9	2.0P	3.9	.75		1.4
Russet Burbank	2.9	4.8	1.3	3.0	.59	63	2.9
A6680-5	2.1	5.0	1.0	4.8	.38		
A66107-12	2.7	4.6	1.4				
A66107-182	2.5	4.9	1.3	4.8	.89	12	2.7
A66107-197	2.6	4.9	1.2				
A66110-7	2.7	5.0	1.0				
A67284-5	2.9	3.7	1.7P				2.2
A68730-7	2.1	4.8	1.6P				1.3
NDA7697-2	1.7	5.0	1.2				
NDA7698-1	2.3	5.0	1.5				
NDA8451-3	1.0	5.0	1.2				
A6673-1	2.7	4.8	1.0				
A6802-3	1.5	5.0	1.1				
A6802-9	2.2	4.9	1.3P			20	
A68587-3	2.7	4.1	1.5			27	
A68588-16	2.4	4.6	1.6P				
A68599-1	2.9	4.5	1.3			5	
A68683-13	3.0	4.9	1.0				3.5
A68684-5	1.4	5.0	1.2				3.8
A68704-4	2.9	2.8	1.1			9	
A68710-5	2.9	4.1	1.1				
NDA8694-3	1.7	5.0	1.1P			8	
Hi-Plains	3.1	4.1	1.7				
Norgold	2.5	5.0	1.2			6	
Pioneer	2.6	4.5	1.3P	4.4	.29		

P.N.W. Table 3. Disease Evaluations (continued page 3)

Clonal Designation	Maturity ^{1/}	Vert ^{2/} Wilt ^{2/}	Scab ^{3/}	E. Blt ^{4/} Foliage	E. Blt ^{5/} Tuber	Leafroll Net Necrosis ^{6/}	Corky Ringspot ^{7/}
A67142-1	3.2	.8	1.4			8	3.6
A68390-1	3.1	3.0	4.3P			10	1.0
A68390-8	3.1	2.3				18	1.1
A68521-3	3.0	4.0	1.5			13	1.1
A69327-5	3.1	1.6	1.6			28	1.1
A69729-3	3.4	1.2	1.4P			49	1.0
A69868-2	3.1	3.2	1.8P			15	1.1
A68457-7	3.2	1.5	1.1			16	1.1
A6810-1	2.5	4.0	2.5P			18	1.3
A68457-15	3.2	2.2	1.0			0	1.3
A68462-8	2.9	2.6	1.0			23	2.2
A68468-5	3.1	2.8	2.7			18	2.1
A68628-2	3.2	1.6	1.2			17	1.2
A69394-3	3.2	1.7	1.1			29	1.4
A69395-1	4.0	1.3	1.0			12	1.5
A69426-1	3.3	2.2	1.3			23	1.0
A69761-2	3.3	1.7	2.3P			17	1.5
A69786-4	3.2	.9	1.0			6	2.8
A69827-2	3.3	1.1	1.3			8	2.6
A69827-4	3.2	1.3	1.1			33	1.4
A69830-1	3.1	.7	1.1			14	1.2
A69850-4	3.5	.6	1.2			1	3.5
A69860-1	3.2	1.6	1.0			9	2.3
A69867-5	3.1	2.2	1.0			56	1.4
B8130-1A	3.3	1.6	1.5P			3	2.0
A67341-1	2.8	4.7	1.2			17	3.3
A68287-5	2.5	4.9	2.0P			9	
A68320-11	2.9	3.5	2.3P			25	
A68586-2	2.7	4.7	1.8			19	
A68689-1	2.7	4.2	1.2				3.0
A68709-2	2.3	2.8	1.2P				1.8
NDA8856-11	1.9	2.4	2.4P				1.2
A68457-7	3.1	1.2	1.2			20	
A68462-8	2.7	2.3	1.1			40	
A68628-2	3.2	1.5	1.0			11	
A69327-5	3.3	1.5	1.1			13	

P.N.W. Table 3. Disease Evaluations (continued page 4)

Clonal Designation	Maturity 1/	Vert 2/	Scab 3/	E. Blt 4/ Foliage	E. Blt/ Tuber	Leafroll Net Necrosis	6/ Ringspot	Corky 7/ Ringspot
A69823-2	1.9	4.9	2.9P			0		1.4
A69827-10	2.8	4.1	1.1			10		1.8
A69868-2	3.1	2.5	1.8P			9		
B7654-4	2.7	3.7	1.6P			12		1.2
NDA8922-3	1.0	5.0	1.0			7		1.5
NDA9019-1	1.7	5.0	1.5			14		2.8
A66110-23	3.2	3.8	1.0					
A6789-7	3.1	1.5	2.2P					2.7
Pioneer	2.6	4.4	1.7P					
A69655-5	3.4	.8	1.3P					
Kennebec								3.2
Sebago								3.4
A6382-10								1.0
B6930-6	2.8			3.8	.46			
B6995-19	2.8			4.9	.54			
B7165-6	3.2			3.0	.38			
B7252-3	2.5			3.6	.16			
B7603-1	3.1			4.1	.21			
B7763-3	2.4			2.8	.61			
B7767-2	2.6			3.9	.45			
B7768-3	3.2			3.3	.38			
B7809-5	2.5			4.9	.26			
B7845-4	2.9			1.9	.77			
B7845-6	2.4			4.8	.43			
B7845-10	2.6			3.6	.65			
B7845-14	2.9			2.6	.41			
B7845-17	2.1			4.3	1.0			
B7845-19	3.3			2.9	.48			
B7845-21	2.9			3.4	.22			
B7845-23	2.8			4.1	.10			
B7845-26	3.1			3.7	.25			
B7858-6	2.8			3.4	.48			
B7865-12	2.9			3.8	.24			
B7888-7	3.0			3.0	.35			
B7888-8	2.2			4.3	.54			
B7888-9	3.3			2.2	.5			

P.N.W. Table 3. Disease Evaluations (continued page 5)

Clonal Designation	Maturity <u>1/</u>	Vert <u>2/</u> Wilt	Scab <u>3/</u>	E Blt <u>4/</u> Foliage	E Blt <u>5/</u> Tuber	Leafroll Net Necrosis <u>6/</u>	Corky Ringspot <u>7/</u>
B7897-1	3.1			4.0	.38		
B7897-3	2.8			4.1	.30		
B7903-1	2.9			3.6	.87		
B7905-8	3.0			2.9	1.2		
B7910A-6	3.1			3.6	1.5		
B7910A-7	2.5			3.1	.21		
B7913-1	2.8			4.1	.78		
B7918-3	2.8			4.6	.73		
B7925-3	2.7			4.7	.72		
B7927-1	2.9			4.0	.30		
B7929-3	2.8			3.4	.86		
B7929-11	2.7			4.3	.58		
B7957-5	2.7			4.0	.24		
B7978-1	3.3			2.0	.57		
B8004-8	3.1			4.5	.41		
B8036-3	3.9			.7	1.1		
B8050-4	3.2			3.3	1.2		
B8123-11	3.3			1.2	.31		
B8123-12	2.7			4.4	.78		
A701040-4				1.7	2.2		
BA8235-1				3.0	.64		
A6673-1				4.7	.21		
A6715-8				1.6	2.3		
BA8290-1				1.3	3.9		
A68678-1							1
A67284-5							51
A69569-10							8
A69573-1							10
A69573-2							31

1/ 1.0 (very early) to 5.0 (very late)
2/ 0 (none) to 5.0 (100% infection)
3/ 1.0 (none) to 5.0 (>40% surface area) P = pit scab
4/ 1.0 (least) to 5.0 (severe)
5/ 0 = (none) to 5.0 (severe)
6/ % tubers exhibiting net necrosis
7/ 1.0 (none) to 4.0 (severe)

P.N.W. Table 4. Distribution of Selections, Varieties, and Seedling Tubers in 1974.

Location	Cooperator	Number	
		Clones	Seedling Families
Alberta	S. Molnar		135
Arizona	P. Bessey	297	
California	R. Voss	8	
Colorado	D. Denna	1	3
Idaho	E. Anderson	5	
	A. Boe	2	
	R. Callihan	4	
	R. DeRouche	1	
	R. Funk	1	
	W. Henninger	20	
Israel	Ch. Shifriss	3	
Lebanon	P. Accatino	4	
Minnesota	F. Lauer	4	
North Carolina	F. Haynes	1	
North Dakota	R. Johansen	6	16
Oregon	T. Jackson	33	
	C. Stanger	44	
	G. Vogt	10	
Texas	J. C. Miller, Jr.	8	
Washington	R. Kunkel	39	

LOUISIANA

James F. Fontenot, Donald W. Newsom, and Roysell J. Constantin

Potato Research

True seed from 30 families were planted in the greenhouse on October 2, 1973, and approximately 2,000 selections were made at harvest (2/14/74). These clones were stored in Baton Rouge until May, 1974, and then shipped to Rhinelander, Wisconsin, and planted in the field. On September 24, 1974, only 74 individuals were considered worthy of further research (Table 1).

Two hundred seventeen first year selections were made in 1973 at Rhinelander, Wisconsin. After growing these clones under Louisiana conditions in 1974 only 60 lines were increased in Wisconsin. After screening to accomplish our objectives this number has decreased to 25 clones. The characteristics of these selections are presented in Table 2. All of these clones have a white skin color. The clones that were outstanding in chipping ability were 31-30, 31-98, and 31-206. Clones which darkened the least after cooking were 31-14, 31-49, 31-53, and 31-76. Total solids were highest in 31-1, 31-22, 31-128, 31-160, 31-164, 31-171, and 31-206. The highest yielding clones were 31-52, and 31-117.

The number of clones selected in 1972 after being first subjected to field conditions was 146. Today only 10 remain (Table 3) and the best appear to be 21-71, 22-78, and 22-122.

Of 212 original selections made in 1971, 10 possess characteristics that are worthy of more research (Table 4). Line 11-1 was very high in total solids and yet its chip quality was not that good. Line 11-24 was characterized as being excellent in tuber type and yield. Line 11-34 was very vigorous and high yielding, while 12-36 was hail resistant but air cracked badly. Line 11-94 was severely damaged by hail but recovered and produced a high yield; tubers of this clone are very nice but very scab susceptible. Lines 11-103 and 11-105 are very nice oblong types. Under Wisconsin conditions in 1974 clones 11-118 was the highest yielder and was of a beautiful shape, yet some tubers had hollow heart and growth cracks. Lines 12-206 and 11-208 were rated as being vigorous and of good horticultural type.

Line 101-70 was the most outstanding of the other clones selected in 1974 (Table 5).

The following clones showed the least tuber greening after exposure to light: 71-110, 21-65, 21-125, 21-71, and 21-59.

The best french fries were made from 71-82, 11-24, 01-70, 91-237 and LaChipper.

Cold tolerance observations are presented in Table 6. Below freezing temperatures were recorded on November 30, December 1, and December 2, 1974. At harvest on January 7, 1975, the vines of 21-59 and 12-206 were still green. The yield and tuber type of 21-59 was only fair, but the yield and tuber type of 12-206 was excellent.

The effect of chemical treatment on cut seedpieces of Red LaSoda is found in Table 7.

In summary, we had poor growing conditions at our locations in 1974, but we have three clones that were so outstanding that we plan to enter them in the regional trial and these are 11-24, 11-118, and 01-70.

Louisiana Table 1. Clones and their parentage selected in 1974 at Rhinelander, Wisconsin

Clone	Parentage	Clone	Parentage
41-1	B6495-12 x 71-110	42-38	12-142 x 62-104
41-2	B7200-8 x 71-110	42-39	12-157 x 22-222
41-3	" "	42-40	12-36 (x) 1973
41-4	" "	42-41	" "
41-5	7808-1 x 71-110	42-42	" "
41-6	Raritan x 81-30	42-43	" "
41-7	" "	42-44	" "
41-8	11-7 x 1859	42-45	" "
41-9	" "	42-46	" "
41-10	" "	41-47	11-57 (x) 1973
41-11	" "	41-48	" "
42-12	" "	41-49	" "
41-13	" "	41-50	" "
41-14	" "	41-51	" "
41-15	" "	41-52	" "
41-16	" "	41-53	" "
41-17	" "	41-54	" "
43-18	51-138 x 1859	41-55	11-44 (x) 1973
41-19	61-48 x 1859 Dr. Miller	41-56	" "
41-20	" " "	42-57	" "
41-21	" " "	42-58	12-34 (x) 1973
41-22	" " "	42-59	" "
41-23	" " "	42-60	" "
41-24	" " "	42-61	" "
41-25	" " "	41-62	" "
41-26	" " "	42-63	" "
42-27	Red LaSoda x 61 x 48 Dr. Miller	42-64	" "
41-28	51-118 x 1859	42-65	" "
41-29	" "	42-66	" "
41-30	41-195 x 1859	42-67	" "
43-31	21-222 x 22-222	42-68	" "
42-32	21-203 x 1859	42-69	" "
42-33	12-166 x 1859	42-70	" "
42-34	12-142 x 62-104	42-71	" "
42-35	" "	42-72	" "
42-36	" "	41-73	12-40 (x) 1973
42-37	" "	42-74	" "

Louisiana Table 2. Notes on 1973 clones selected at Rhinelander, Wisconsin--1974

-65-

Clone	Vigor	1/ Maturity	2/ Parentage	Fall '74 performance	Chip ₃ / color	After cooking darkness ₃	Dry matter %	Remarks
31-1	3	M	12-142 x 1859	good	6.00	5.50	19.5	
31-14	2	E	61-29 x 71-110	poor	4.67	3.17	17.9	
31-22	5	E	"	fair	6.00	5.33	19.7	
31-30	2	E	"	poor	3.00	5.33	18.5	low yield
31-49	4	E	"	poor	5.33	3.33	18.7	excellent
31-52	4	E	"	fair	4.00	5.00	18.4	excellent, high yield
31-53	3	M	71-177 x 71-110	poor	4.17	2.17	17.4	good
31-76	4	L	61-71 x 71-110	poor	4.67	3.17	17.5	
31-83	3	E	"	good	5.33	5.67	15.9	excellent
31-92	4	E	"	good	4.67	4.33	17.1	
31-98	4	E	"	poor	3.67	7.50	17.4	very good
31-102	4	E	"	poor	5.67	5.83	12.7	
31-114	4	L	61-80 x 71-110	poor	5.67	6.83	17.9	
31-117	4	M	"	poor	5.33	5.00	13.5	high yield
31-124	3	M	Minn. 1317 x 71-110	poor	6.33	6.83	16.1	
31-128	4	E (late)	"	poor	5.33	7.67	19.7	
31-143	3	E	71-80 x 71-110	fair	4.83	6.67	16.7	nice, round
31-148	4	E	"	poor	6.00	5.50	16.8	very good
31-150	4	E	"	poor	5.33	5.33	17.5	very good
31-160	3	M	8117 x 1859	poor	6.00	4.83	19.6	
31-164	4	M	61-48 x 11-150	poor	6.67	4.83	19.5	oblong
31-171	3	M	"	poor	5.67	6.00	19.2	
31-191	2	M	51-176 x 1859	poor	4.00	4.83	18.1	
31-194	3	M	"	poor	4.50	4.33	16.5	excellent
31-206	4	ME	4465 (x)	fair	3.67	5.83	19.6	pink, good

1/ Vigor: 1 = weak, 5 = very vigorous

2/ Maturity: E = early, M = medium, L = late, VL = very late

3/ Rating 1 - 10 (1 = most desirable, 10 = least desirable)

Louisiana Table 3. Notes on 1972 clones selected at Rhinelander, Wisconsin--
1974

Clone	Vigor ^{1/}	Maturity ^{2/}	Parentage	Chip color ^{3/}	Dry matter %	Remarks
22-11	3	M	61-48 x 41-182	5.5		
21-14	4	M	51-80 x 41-182	7.0		
22-51	3	M	21-26 x A-4-22-222	9.0		
21-71*	5	L	61-71 (x)	7.0	19.7	white seed, long
22-78	3	M	72-7 (x)	8.3	20.5	good, late
21-89	3	ME	71-61 (x)	9.0	17.7	
21-99	4	L	71-61 x 8340	8.0	20.5	seed
21-103	4	L	72-190 x A-4-22-222	10.0	20.1	
22-122	4	M	12-166 x 62-104	8.0	17.5	nice
21-140	3	ME	Superior x 1859	7.0	19.4	excellent

1/

Vigor: 1 = weak, 5 = very vigorous

2/

Maturity: E = early, M = medium, L = late, VL = very late

3/

Rating 1 - 10 (1 = most desirable, 10 = least desirable)

*Excellent

Louisiana Table 4. Notes on 1971 clones--1974

Clone	Vigor	1/ Maturity	2/ Parentage	Chip 3/ color	After cooking darkness3/	Dry matter %	Remarks
11-1	3	ML	71-61 x 41-182	7.67	6.33	21.4	
11-24	3	ML	62-104 x A-2-22-222	7.67	4.17	18.7	nice
12-34	5	L	" "	9.00	5.33	15.0	
12-36	4	ML	" "	9.00	7.67	18.4	air cracks, hail resistant
11-94	3	ME	61-112 x 41-182	8.67	4.67	17.3	nice but scabby, E hail damage, recovered quickly
11-103	3	ME	61-112 x 8340	8.67	3.17	18.1	nice, oblong
11-105	3	M	" "	9.00	5.00	18.3	oblong
11-118*	3	ML	61-84 x 41-182	7.67	4.33	17.5	
12-206	4	ME	RLS x 62-104	8.00	6.17	14.9	o.k.
11-208	4	ME	61-80 (x)	7.33	4.00	19.0	nice

*Extremely high yielder, very beautiful shape, but growth cracks and hollow heart

1/ Vigor: 1 = weak, 5 = very vigorous

2/ Maturity: E = early, M = medium, L = late, VL = very late

3/ Rating 1 - 10 (1 = most desirable, 10 = least desirable)

Louisiana Table 5. Other clones selected at Rhinelander in 1974

Clone	Vigor <u>1/</u>	Maturity <u>2/</u>	Parentage	Chip <u>3/</u> color	After cooking darkness <u>3/</u>	Dry matter %	Remarks
71-82	3	M	11-150 x 11-40	3.00	5.33	20.0	wilts, low yield
71-110	3	M	Chippewa x 11-150	3.33	5.00	19.2	
91-237	3	M	42-225 x 22-234	3.33	3.33	18.9	good yield, late
02-59	3	L	LaRouge x 1859	5.33	4.67	17.3	
01-70	4	L	LaChipper x 1859	4.16	3.83	21.7	
01-115	5	ML	11-150 x 1859	8.00	4.67	16.6	poor foliage, russet
01-201	3	E	72-4 x 22-222	4.67	5.00	18.4	fair foliage, small sack
Red LaSoda	4	L	Triumph x Kat. (mutant)	7.00	3.5	18.0	
LaRouge	4	ML	02-5 (x)	6.00	3.5	17.7	
LaChipper	3	M	Gr. Mt. x Cayuga	3.33	3.5	18.4	

1/ Vigor: 1 = weak, 5 = very vigorous

2/ Maturity: E = early, M = medium, L = late, VL = very late

3/ Rating 1 - 10 (1 = most desirable, 10 = least desirable)

Louisiana Table 6. Cold tolerance observations*

Clone	Parentage	Remarks
21-59	61-71 (x)	vines most frost resistant, green on 1/7/75, tuber type fair
12-206	RLS x 62-104	vines green 1/7/75, high yield, excellent type
21-14	51-80 x 41-182	vines green on 12/3/74
22-78	72-7 (x)	" " " "
21-128	61-112 (x)	" " " " , extremely large tubers
31-94	61-71 x 71-110	" " " "
31-212	Cobbler x 11-170	" " " "
21-99	71-61 x 8340	large tubers on 1/7/75
LaRouge	02-5 (x)	good yield on 1/7/75
Red LaSoda	Triumph x Kat. (mutant)	fair yield on 1/7/75
LaChipper	Gr. Mt. x Cayuga	fair yield on 1/7/75

*Below freezing temperatures were recorded on Nov. 30, 1974, Dec 1, 1974, and Dec. 2, 1974.

Louisiana Table 7. Effect of chemical treatment on cut seedpieces of Red LaSoda*

Treatment	Remarks
1. 500 ppm ethephon	cut - poor vine and tuber type
2. 1000 ppm ethephon	cut - poor vine and tuber type
3. 2000 ppm ethephon	cut - poor vine and tuber type
4. Control	cut - poor vine and tuber type
**5. 3-1/8 ppm GA	whole - poor vine and tuber type, few tubers
**6. 3-1/8 ppm GA	cut - very good vine and tuber type
**7. 6-1/4 ppm GA	cut - fair vine and tuber type, fair yield, leaning to oblong
***8. 12-1/2 ppm GA	cut - very good vine and tuber type, very good yield, color, oblong shape
***9. 25 ppm GA	cut - very good vine and tuber type, excellent yield and color, oblong shape
***10. 50 ppm GA	cut - very good vine, tuber type, and yield
***11. 100 ppm GA	cut - very good vine, tuber type, and yield
**12. Control	cut - very good vine, tuber type, and yield
13. Control	whole - no tubers
14. Control	sprouted cut - good vine and tuber type
15. Control	cut - poor vine and yield

*Test planted 10/15/74; harvested 1/7/75

**Vine growth normal after emergence

***Vine growth spindly at first; later became more normal but spreading

USDA, Orono, Maine

Simeon S. Leach, David Wilson, and R. E. Webb

Resistance to Fusarium Tuber Rot (Fusarium roseum 'Sambucinum'). Inoculum for this test was grown on potato dextrose agar. Spores were washed from seven day old cultures and adjusted to 5000 per ml. The tubers of the test clones were inoculated with a hypodermic syringe at the bud and stem ends. The inoculum (100 spores) was injected into the tubers 7 mm below the tuber surface. The inoculated tubers were stored in a controlled environment room maintained at 55°F and 95% relative humidity for 21 days. At the end of the storage period the tubers were removed and scored for tuber rot development. The degree of rot in a tuber was determined by cutting through the inoculation sites and measuring the length and width of the decayed area. Three tests were conducted and the average ratings are in Table 1. The average rating for the susceptible check Russet Burbank was 28.8. The average for the resistant variety Hudson was 14.1. No pedigree tested was immune to tuber rot.

Orono Table 1.--Pedigrees tested in Fusarium tuber rot trials, 1974-75

Pedigree	Tuber rot	Pedigree	Tuber rot
BA 6893-3	21.2	B 7861-2	14.3
BA 6893-4	22.1	B 7863-2	17.0
BA 68504-1	20.8	B 7863-5	17.0
BA 69433-3	22.6	B 7863-6	23.2
B 7157-9	19.4	B 7866-3	14.4
B 7188-2	19.1	B 7871-5	26.1
B 7196-74	19.2	B 7872-7	12.8
B 7583-6	12.2	B 7888-7	22.6
B 7583-19	14.9	B 7888-8	23.9
B 7587-5	21.2	B 7888-9	20.6
B 7607-3	12.7	B 7897-3	28.0
B 7637-7	23.7	B 7901-3	20.3
B 7637-9	25.6	B 7901-5	23.3
B 7644-1	22.6	B 7903-1	19.3
B 7645-5	13.9	B 7905-2	22.6
B 7645-12	18.8	B 7901A-11	16.1
B 7655-9	18.5	B 7911-1	22.2
B 7678-2	29.8	B 7913-1	16.0
B 7678-6	13.5	B 7918-3	28.3
B 7678-12	18.5	B 7927-1	13.4
B 7679-9	16.3	B 7929-11	12.1
B 7680-6	16.8	B 7930-2	14.8
B 7680-10	16.5	B 7939-4	11.7
B 7684-3	15.8	B 7957-5	13.1
B 7684-4	13.2	B 7958-1	19.9
B 7684-6	15.1	B 7978-1	19.8
B 7684-7	16.9	B 7987-1	23.3
B 7685-8	14.3	B 8004-8	19.2
B 7711-2	19.9	B 8019-4	18.7
B 7732-2	24.7	B 8018-2	17.6
B 7825-5	17.1	B 8036-1	20.6
B 7828-1	18.9	B 8050-1	16.4
B 7828-9	30.4	B 8050-2	24.6
B 7830-4	19.2	B 8086-3	13.7
B 7838-2	23.8	B 8087-6	20.9
B 7839-7	11.9	B 8088-2	22.9
B 7840-2	15.8	B 8091-8	24.8
B 7845-4	25.2	B 8101-3	19.5
B 7845-6	25.6	B 8101-3	22.3
B 7845-10	23.6	B 8111A-5	15.2
B 7845-17	22.2	B 8123-3	11.9
B 7845-19	19.8	B 8125-5	22.7
B 7845-29	20.1	B 8140-5	20.9
B 7848-2	19.5	B 8145-1	22.0
B 7848-16	18.4	B 8148-4	17.3
B 7848-19	16.2	B 8151-1	14.1
B 7848-23	23.4	B 8154-9	14.3
B 7849-5	14.9	Superior	13.2
B 7853-2	16.0	Russet Burbank	28.8
B 7859-2	16.8	Hudson	14.1
		B 6987-57	11.9

MAINE - 1974

Hugh J. Murphy and Michael J. Goven

Cooperative variety trials were conducted in 1974 at Presque Isle, Grand Isle, and Newport, Maine. Cool weather and dry soil conditions at planting time were followed by almost ideal growing conditions the remainder of the season with the net result very high yields.

Plots at all test locations were single rows, 25 feet long and replicated six times per variety. Planting, killing, harvest dates, seedpiece spacing, and fertilizer used at each location are presented in Maine Table 5.

Yields and specific gravities for varieties grown at all locations are presented in Maine Table 1. The seven highest yielding varieties were: Penn 71, Hudson, Belle Isle, BR6626-5, BR6864-9, B6139-11, and BR7093-23. The seven highest ranking varieties in specific gravity were: Belle Isle, Cariboo, B6965-10, B6987-29, BR6863-8E, BR7088-18, and B6987-56. Of the varieties grown in the Maine cooperative variety trials in 1974 only about five had specific gravities below 1.075 which indicates high yields of dry matter in addition to high yields of tubers which were obtained in 1974.

Size determinations for two market size classes are presented in Maine Table 2. Several varieties grown at all three locations produced high percentages of small sized tubers, primarily because of the very heavy set that occurred in 1974. In general, average tuber size at Presque Isle was better than at either Newport or Grand Isle which might be attributed to the earlier planting date and better soil conditions at Presque Isle.

Results of the first chipping and french fry tests are presented in Maine Tables 3 and 4, respectively. Very few varieties made satisfactory chip color (7.0 or less) in 1974 because of the cool temperatures during the harvest periods. It is well to note, however, that even under adverse conditions, B6503-5, B6965-10, B6986-2, B6987-29, and BR7093-20 had acceptable chip color over a wide range of location differences. All except eight of the 46 varieties grown at Presque Isle had satisfactory (3.0 or less) french fry color. Three varieties, Hudson, BR7103-1, and CA03-25 had unsatisfactory french fry texture.

More details of the Maine Cooperative Variety trials are presented in the Annual Maine, New Hampshire, Vermont Potato Variety Trial Report for 1974, which is available from Public Information and Central Services, University of Maine; Orono, Maine 04473.

Maine Table 1. Yield and specific gravity of potato varieties grown at Presque Isle, Grand Isle, and Newport, Maine - 1974

Variety	Presque Isle		Grand Isle		Newport	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
Belle Isle	490	1.094	422	1.091		
Cariboo	458	1.091	385	1.091	339	1.081
Cobbler	386	1.077	331	1.081		
Hudson	491	1.070	404	1.071		
Iopride	451	1.075	409	1.075	338	1.074
Katahdin	429	1.078	336	1.075		
Kennebec	448	1.069	408	1.080	368	1.076
Nampa	342	1.081	332	1.080		
Nooksack	329	1.082	280	1.082		
Penn 71	497	1.079	401	1.080	403	1.076
Russet Burbank	377	1.087	354	1.080		
Shurchip	409	1.069	401	1.077		
Targhee	338	1.080	258	1.078		
York	282	1.078	251	1.083		
B6139-11	441	1.086	432	1.084	358	1.080
B6503-5	321	1.083	254	1.084	230	1.082
B6529-12	436	1.072	379	1.073		
B6965-10	410	1.093	368	1.094	296	1.085
B6986-2	381	1.080	350	1.085	353	1.077
B6986-24					282	1.078
B6987-2	384	1.077	332	1.067		
B6987-29	424	1.092	388	1.093		
B6987-56	457	1.089	362	1.093	366	1.087
B7033-33	380	1.083	292	1.085	283	1.077
B7167-2					239	1.079
BR6316-5					391	1.081
BR6626-5	466	1.078	423	1.076		
BR6820-15	406	1.064	367	1.068		
BR6862-2	400	1.085	363	1.083	315	1.078
BR6863-3	359	1.081	300	1.086	285	1.081
BR6863-8E	424	1.093	376	1.092		
BR6864-9	464	1.077	409	1.072		
BR7088-18	422	1.093	347	1.091	300	1.082
BR7089-6	447	1.086	356	1.091	364	1.083
BR7093-4	317	1.071	296	1.073		
BR7093-5	401	1.084	386	1.083	284	1.072
BR7093-20	313	1.080	291	1.084	291	1.077
BR7093-23	461	1.085	449	1.085		
BR7102-4			299	1.078		
BR7103-1	404	1.075	382	1.078		
BR7104-10	421	1.072	362	1.073	394	1.076
BR7108-1	420	1.081	368	1.083	311	1.076
BR7108-2	365	1.087	327	1.091	321	1.082
CA03-25	416	1.068	390	1.066		
CA23-6			331	1.085		

Maine Table 1 - continued.

Variety	Presque Isle		Grand Isle		Newport	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
CA26-4			397	1.072		
CA28-2	364	1.079				
CA40-7	441	1.076	388	1.078		
CA46-11	401	1.078	309	1.081		
CA61-3	365	1.082	279	1.085	324	1.083
CAM67-2	445	1.072	368	1.072	335	1.072
F61025					298	1.077
F6208	417	1.083	357	1.080		
Bayes L.S.D. (0.05)	36	0.004	32	0.004	35	0.002

Maine Table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at Presque Isle, Grand Isle, and Newport, Maine - 1974.

Variety	Presque Isle		Grand Isle		Newport	
	1-7/8	2-1/4	1-7/8	2-1/4	1-7/8	2-1/4
	to 4 inches	to 4 inches	to 4 inches	to 4 inches	to 4 inches	to 4 inches
Belle Isle	94.3	78.1	93.3	74.2		
Cariboo	92.4	70.0	90.4	59.7	91.8	68.3
Cobbler	93.7	69.4	89.7	56.9		
Hudson	83.5	76.2	94.7	85.8		
Iopride	97.1	86.9	96.0	76.3	95.4	83.6
Katahdin	90.5	82.3	94.1	84.7		
Kennebec	95.8	86.5	94.8	85.6	97.8	88.1
Nampa	56.4% 4 - 10 oz.		58.4% 4 - 10 oz.			
Nooksack	63.2% 4 - 10 oz.		69.1% 4 - 10 oz.			
Penn 71	93.3	85.3	92.8	80.4	94.4	85.4
Russet Burbank	57.7% 4 - 10 oz.		58.9% 4 - 10 oz.			
Shurchip	93.0	74.4	95.1	75.4		
Targhee	57.4% 4 - 10 oz.		54.6% 4 - 10 oz.			
York	94.1	72.8	92.0	62.9		
B6139-11	92.0	68.5	93.3	68.6	95.3	78.2
B6503-5	96.1	80.4	95.8	75.7	94.9	77.6
B6529-12	92.9	86.3	93.7	84.4		
B6965-10	94.6	77.7	93.7	74.8	95.4	77.6
B6986-2	95.1	85.6	94.8	85.5	86.5	79.7
B6986-24					97.2	88.8
B6987-2	93.4	83.1	93.5	80.8		
B6987-29	93.0	82.7	94.7	83.5		
B6987-56	95.1	82.3	94.5	81.0	92.8	81.5
B7033-33	96.2	85.1	94.3	80.6	89.1	79.5
B7167-2					91.5	66.1
BR6316-5					96.5	88.6
BR6626-5	95.0	80.1	93.7	83.5		
BR6820-15	92.9	71.0	92.9	69.2		
BR6862-2	94.2	82.8	93.3	81.1	94.3	85.0
BR6863-3	95.2	85.6	94.5	83.9	95.5	84.9
BR6863-8E	92.6	65.4	92.6	64.2		
BR6864-9	94.0	73.3	94.1	76.6		
BR7088-18	95.4	78.1	95.4	80.7	94.1	74.1
BR7089-6	95.3	83.6	95.6	83.7	97.2	85.5
BR7093-4	93.6	63.7	91.4	61.7		
BR7093-5	92.8	84.0	94.7	86.7	92.8	85.8
BR7093-20	95.7	80.5	94.1	82.4	96.7	85.4
BR7093-23	94.5	75.2	95.7	79.7		
BR7102-4			91.3	77.8		
BR7103-1	92.8	79.2	96.4	84.5		
BR7104-10	95.1	78.0	92.4	74.6	95.7	83.1
BR7108-1	91.2	72.8	93.8	77.8	90.8	75.2
BR7108-2	93.2	72.9	92.7	71.7	94.0	75.9

Maine Table 2 - continued.

Variety	Presque Isle		Grand Isle		Newport	
	1-7/8	2-1/4	1-7/8	2-1/4	1-7/8	2-1/4
	to 4 inches	to 4 inches	to 4 inches	to 4 inches	to 4 inches	to 4 inches
CA03-25	96.4	79.0	96.4	78.1		
CA23-6			92.3	85.8		
CA26-4			91.7	80.5		
CA28-2	42.1% 4 - 10 oz.					
CA40-7	96.0	82.5	95.4	78.8		
CA46-11	93.4	73.6	91.5	72.2		
CA61-3	93.4	70.7	90.8	63.4	93.5	75.6
CAM67-2	95.2	87.9	93.3	84.2	93.2	85.1
F61025					95.3	84.5
F6208	94.8	82.0	96.2	88.6		

Maine Table 3. Chip color indices¹ for potato varieties grown at Presque Isle, Grand Isle, and Newport, Maine - 1974.

Variety	Presque Isle	Grand Isle	Newport
Belle Isle	10.0	10.0	
Cariboo	10.0	9.6	8.5
Cobbler	9.8	9.5	
Hudson	9.0	9.8	
Iopride	9.6	10.0	9.1
Katahdin	9.0	10.0	
Kennebec	10.0	9.9	9.3
Nampa	10.0	10.0	
Nooksack	9.6	10.0	
Penn 71	7.4	9.4	7.5
Russet Burbank	8.0	10.0	
Shurchip	7.0	9.4	
Targhee	10.0	9.9	
York	7.2	7.1	9.5
B6139-11	6.4	9.3	7.9
B6503-5	5.4	5.3	4.6
B6529-12	7.8	8.7	
B6965-10	3.0	6.5	4.9
B6986-2	5.4	7.2	5.5
B6986-24			7.3
B6987-2	8.4	8.6	
B6987-29	6.0	7.6	
B6987-56	7.8	8.7	8.2
B7033-33	7.6	8.6	8.3
B7167-2			4.8
BR6316-5			8.1
BR6626-5	9.0	10.0	
BR6820-15	10.0	9.9	
BR6862-2	7.8	9.2	8.3
BR6863-3	6.4	7.2	6.5
BR6863-8E	5.0	7.6	
BR6864-9	8.4	9.8	
BR7088-18	6.2	8.3	7.3
BR7089-6	9.0	9.0	8.4
BR7093-4	8.0	8.9	
BR7093-5	6.4	8.1	7.0
BR7093-20	5.0	6.9	5.8
BR7093-23	6.8	9.0	
BR7102-4		9.1	10.0
BR7103-1	8.6	9.7	
BR7104-10	10.0	9.7	8.9
BR7108-1	7.6	9.3	7.3
BR7108-2	9.0	9.7	
CA03-25	10.0	10.0	8.9

Maine Table 3 - continued

Variety	Presque Isle	Grand Isle	Newport
CA23-6		9.3	
CA26-4		10.0	
CA28-2	7.4		
CA40-7	10.0	10.0	
CA46-11	8.4	9.5	9.5
CA61-3	5.0	7.0	7.9
CAM67-2	10.0	10.0	9.4
F61025			8.5
F6208	10.0	10.0	
Bayes L.S.D. (0.05)	0.6	0.6	0.8

¹/Chips with lower index numbers are lighter in color.

Maine Table 4. French fry color and texture indices for potato varieties grown at Presque Isle, Maine - 1974.

Variety	Color Index ¹	Texture Index ²
Belle Isle	3.2	1.0
Cariboo	1.0	1.0
Cobbler	2.6	1.0
Hudson	4.2	2.0
Iopride	2.4	1.0
Katahdin	2.8	1.0
Kennebec	3.0	1.0
Nampa	4.6	1.0
Nooksack	1.0	1.0
Penn 71	1.0	1.0
Russet Burbank	3.0	1.0
Shurchip	2.0	1.0
Targhee	4.0	1.0
York	2.6	1.0
B6139-11	1.0	1.0
B6503-5	1.0	1.0
B6529-12	2.0	1.0
B6965-10	1.0	1.0
B6986-2	1.0	1.0
B6987-2	3.0	1.0
B6987-29	1.0	1.0
B6987-56	2.0	1.0
B7033-33	2.0	1.0
BR6626-5	4.0	1.0
BR6820-15	3.0	1.4
BR6862-2	2.4	1.0
BR6863-3	1.0	1.0
BR6863-8E	1.2	1.0
BR6864-9	2.8	1.0
BR7088-18	1.6	1.0
BR7089-6	3.0	1.0
BR7093-4	1.0	1.0
BR7093-5	1.0	1.0
BR7093-20	1.0	1.0
BR7093-23	1.0	1.0
BR7103-1	4.0	2.0
BR7104-10	4.0	1.0
BR7108-1	2.0	1.0
BR7108-2	3.8	1.0
CA03-25	3.2	1.8
CA28-2	3.4	1.6
CA40-7	4.2	1.0

Maine Table 4 - continued.

Variety	Color Index ¹	Texture Index ²
CA46-11	1.6	1.0
CA61-3	1.6	1.0
CAM67-2	4.0	1.4
F6208	2.6	1.0
Bayes L.S.D. (0.05)	0.6	0.5

¹/ French fries with lower index numbers are lighter in color.

²/ Lower texture indices indicate mealier texture.

Maine Table 5. Pertinent information about Maine Cooperative Potato Variety Trials - 1974.

	Presque Isle	Grand Isle	Newport
<u>Planted:</u>	May 20	June 4	June 3
<u>Killed:</u>			
Early varieties	August 29	September 2	September 5
Medium varieties	September 9	September 12	September 5
Late varieties	September 19	September 23	September 5
<u>Harvested:</u>			
Early varieties	September 9	September 12	September 24
Medium varieties	September 19	September 23	September 24
Late varieties	September 30	October 2	September 24
<u>Fertilization:</u>			
Pounds per acre N, P ₂ O ₅ , K ₂ O	135-135-135	150-225-225	160-180-180
<u>Seedpiece spacing:</u>	<u>¹/</u>	<u>¹/</u>	<u>²/</u>

¹/ Seedpieces of Russet Burbank and Nampa spaced 16 inches apart; Nooksack and Targhee were spaced 12 inches apart; seedpieces of all other varieties spaced 8 inches apart.

²/ Seedpieces of all varieties spaced 8 inches apart.

MISSISSIPPI

C. P. Hegwood, Jr.

Irish Potato Variety Trials

Location and Procedure. The 1974 Irish potato trials were conducted at the Delta Branch Experiment Station, Stoneville, Mississippi, which is in the Yazoo-Mississippi Delta area. Two named cultivars and 18 line selections were evaluated in a randomized complete block design with four replications. Plot dimensions were 3.3 x 25 feet rows. Soil type was a Bosket sandy loam. Fertilizer (10-20-20) was applied broadcast at the rate of 350 lbs per acre. Thimet at the rate of five lbs per acre was the herbicide used.

Climatic Conditions. The growing season was from March 5 to June 11. The last spring freeze occurred on March 25 and scattered frosts occurred on April 6 and 9. March precipitation was slightly lower than a 30 year average for the area. April precipitation was 10.37 inches which represents a 5.28 inch excess over the 30 year average; May total was 6.41 inches (1.83 inch excess); and June total was 8.23 inches (4.56 inch excess).

Mississippi Table 1. Yield, quality, and color data for two cultivars and 18 line selections.

Entry Identification	Yield/A cwt		Specific gravity ^{1/}	Color rating	
	Total	No. 1		Boiled potatoes ^{2/}	chips ^{3/}
B7620-4	274	230	1.065	3.2	8.5
B7654-12	255	196	1.076	2.0	3.7
B7664-2	233	166	1.065	2.2	5.2
B7649-5	259	216	1.062	1.7	5.2
B7629-3	307	247	1.060	2.6	6.2
B7024-5	207	179	1.061	3.2	3.7
B7621-2	290	254	1.063	2.7	5.7
B7024-17	262	239	1.073	3.5	5.7
6987-56	283	245	1.079	2.0	4.5
6987-43	217	183	1.070	2.5	4.2
6516-15	222	191	1.068	2.5	4.2
7573-3	238	180	1.065	2.7	4.0
B7572-2	219	174	1.078	3.0	6.2
B7190-2	209	170	1.068	3.7	6.0
B7152-14	281	237	1.068	2.0	4.5
B7134-3	199	144	1.060	3.2	6.2
B7148-1	200	164	1.055	4.0	5.0
B7132-14	238	198	1.065	2.0	5.0
Norchip	263	225	1.070	2.5	5.0
Kennebec	261	209	1.055	2.2	5.2

^{1/} Specific gravity was determined by potato hydrometer.

^{2/} Average visual color rating as scored by a panel of four experienced judges.
Rating: 1 = white; 5 = dark.

^{3/} Average visual color rating as scored by a panel of five experienced judges.
Rating: 1 = white; 10 = dark.

NEBRASKA

R. B. O'Keefe

Potato Genetics

Factors Affecting Post-harvest Quality of Potatoes - This research is contributing to the NCM-45 Regional Research project.

Samples of 71 potato varieties and selections grown in the North Central States uniform trials (1970-1973) have been evaluated for 12 factors associated with market and processing quality (see attached Tables). Nine to twelve locations (environments) ranging from Louisiana to North Dakota have been involved in each of the four years. The objectives of the study are: 1) To determine the effects of genotype environment and their interaction on quality factors of raw potatoes and processed chips; 2) to determine the correlations among quality factors; 3) to obtain estimates of heritability and repeatability for quality factors, and to establish selection indices for use in the identification of superior genotypes (varieties) for the North Central Region and specific locations within the region.

Combined data for 1970 and 1971 were reported in the 1973 report for seven selections and six factors. Year, location and genotypic effects were found to be significant for all factors except soluble protein. Genotype - year and genotype - location effects were significant only for Rd value (chip color), total sugars and total solids. Heritability estimates were high to intermediate for total sugars, total solids, reducing sugar and chip color but low for soluble protein.

Combined data for seven selections from the 1972 and 1973 trials plus individual year data for 25 additional selections are presented in this report (Nebraska Table 1).

The factors measured were total yield, total solids, chip yield, oil content of chips, total sugars, reducing sugars, chip sugar indices (inhibition, reversion and stability).

The reducing sugar indices were calculated as follows:

Inhibition Index = $(RS_1 + RS_2) \div RS_1$

RS₁ = % Reducing sugar in original sample

RS₂ = % Reducing sugar after 8 weeks of 38° F storage.

Index of 2 = no change in reducing sugar at low temperature.

Reversion Index = $(RS_2 + RS_3) \div RS_1$

RS₃ = % Reducing sugar after reconditioning at 60° F for 6 weeks.

Index 2X Inhibition Index = no reversion.

Index less than 2X Inhibition = degree of reconditioning.

Stability Index = Inhibition Index - Reversion Index.

Index of "0" = complete reversion to original reducing sugar level.

Index less than "0" = incomplete reversion.

Index greater than "0" = increase in reducing sugar during reconditioning.

Nebraska Table 1. Mean values and analyses of variance for quality factors.

Mean values of 1st. Chipping

Years	Yield Cwt/A	%Total Solids	Chip Yield	%Oil	%Total Sugar	%Red. Sugar	PCI Color	Rd Value	%Sol. Prot.DW	Inhib. Index	Rever. Index	Stab. Index
1972	330	17.2	29.7	48.2	.672	.288	4.1	46.2	4.90	7.5	10.8	-3.3
1973	296	17.2	29.3	36.5	.647	.317	3.7	36.7	5.53	13.8	17.8	-3.9
<u>Locations</u>												
Kansas	'72 319	15.5	28.2	46.7	.793	.326	5.1	38.7	----	4.2	9.1	-4.6
Kansas	'73 314	14.6	30.8	31.9	.524	.181	4.0	30.1	5.58	23.4	27.7	-4.3
Michigan	'72 353	17.2	29.0	52.1	.405	.141	2.4	57.5	5.63	12.1	22.3	-10.1
Michigan	'73 333	17.5	29.4	----	.448	.265	2.6	41.0	5.30	14.0	19.1	-5.0
Alliance	'72 273	17.0	29.3	51.0	.335	.174	3.1	50.1	2.68	13.0	14.2	-1.1
Alliance	'73 427	18.1	28.4	----	.565	.277	3.0	41.0	5.76	7.5	13.0	-5.5
No. Dakota	'72 203	20.3	31.1	44.7	.785	.349	4.7	42.5	3.51	6.6	9.1	-2.4
No. Dakota	'73 97	17.9	29.1	----	.402	.193	2.7	46.3	6.67	18.3	23.0	-4.7
Wisconsin	'72 658	15.9	29.3	50.7	1.057	.588	6.3	35.6	5.03	3.8	6.2	-2.3
Wisconsin	'73 463	17.8	28.7	----	.859	.496	4.0	37.7	4.77	5.6	7.8	-2.2
<u>1972</u>												
Ind. (South)	'72 255	18.4	31.8	48.2	.768	.217	2.6	56.2	----	3.8	4.8	-1.0
Ind. (North)	'72 424	15.5	28.9	57.2	.501	.280	3.9	46.8	6.65	6.5	9.6	-3.0
Missouri	'72 202	18.9	30.0	45.2	.584	.206	2.0	56.6	----	6.0	9.6	-3.5
Ohio	'72 414	17.0	29.0	39.4	.678	.281	6.6	34.7	4.90	14.3	17.1	-2.8
Central City	'72 204	16.4	30.4	46.8	.815	.320	4.3	43.6	----	4.3	6.3	-2.0
<u>1973</u>												
Lincaln	'73 332	16.2	29.4	35.4	.469	.186	3.0	36.0	5.39	23.0	29.5	-6.5
Louisiana	'73 106	18.1	29.4	42.2	1.258	.620	6.7	24.7	5.29	4.6	4.2	0.3

Nebraska Table 1. (continued)

Yield		%Total	Chip	%Oil	%Total	%Red.	PCII	Rd.	%Sol.	Inhib.	Rever.	Stab.
Cwt/A		Solids	Yield		Sugar	Sugar	Color	Value	Prot.DW	Index	Index	Index
Varieties (Genotypes)												
'72 Minn 3935	302	17.2	29.4	50.5	.673	.253	4.6	44.5	4.36	8.1	12.9	-4.7
'73 Minn 3935	319	17.0	29.1	83.0	.660	.315	3.5	37.3	5.79	15.2	21.6	-6.3
	310	17.2	29.3	47.6	.672	.279	4.2	41.6	5.37	11.0	16.4	-5.4
'72 La.71-82	324	17.1	29.8	47.7	.503	.231	3.4	50.0	6.18	10.0	13.0	-3.0
'73 La.71-82	225	16.9	28.5	38.5	.605	.300	3.2	37.8	4.66	10.3	12.4	-1.8
	284	17.1	29.3	45.6	.545	.260	3.4	45.0	5.36	10.2	12.7	-2.5
'72 La.71-110	341	16.3	28.4	50.4	.754	.317	4.4	41.9	4.73	7.6	11.6	-3.9
'73 La.71-110	310	16.6	28.5	36.7	.560	.252	3.8	36.5	5.44	17.6	24.7	-7.0
	329	16.4	28.5	47.3	.674	.291	4.2	39.7	5.15	11.7	17.0	-5.2
'72 Norland	265	16.5	29.1	48.4	.586	.273	3.6	49.5	4.82	7.9	11.6	-3.7
'73 Norland	269	16.3	28.6	35.8	.625	.313	3.7	35.1	6.13	16.6	21.1	-4.4
	267	16.5	28.9	45.5	.602	.289	3.6	43.6	5.73	11.5	15.5	-4.0
'72Red Pontiac	446	16.4	29.0	49.0	1.148	.482	6.2	37.9	5.50	4.6	6.3	-1.6
'73Red Pontiac	336	16.2	29.5	38.7	.918	.430	4.4	33.6	6.39	9.7	12.1	-2.4
	401	16.4	29.2	46.7	1.054	.461	5.5	36.2	6.12	6.7	8.7	-1.9
'72 Cobbler	311	18.5	31.0	42.8	.595	.270	3.8	47.5	3.92	6.2	9.3	-3.0
'73 Cobbler	291	18.3	30.2	35.0	.686	.380	4.1	36.3	4.78	12.1	12.8	-3.6
	303	18.5	30.7	41.0	.633	.316	3.9	42.9	4.42	8.6	11.9	-3.2
'72 Norchip	323	18.5	31.1	48.6	.440	.193	2.7	52.2	4.48	8.0	11.2	-3.2
'73 Norchip	321	19.0	30.9	32.9	.473	.227	3.0	40.3	5.54	14.5	16.7	-2.2
	323	18.7	31.1	45.0	.454	.207	2.8	47.3	5.15	10.6	13.5	-2.8
1972												
ND 6925-13	255	18.2	31.2	49.0	.830	.320	5.3	41.9	4.69	5.3	7.1	-1.8
ND 7103-4	221	18.7	31.0	46.2	.364	.132	2.2	52.3	4.33	15.5	23.7	-8.2
ND 7196-18	295	17.8	31.0	51.3	.447	.191	2.7	51.9	5.06	8.9	12.1	-3.1
Neb.1.57-1	273	18.0	30.2	48.2	.469	.191	3	49.8	4.98	9.0	13.8	-4.7
Neb.99.56-4x	248	17.5	31.4	48.7	.390	.158	2.3	49.3	5.26	15.6	24.8	-9.2
Neb.139.59-1	245	16.9	30.0	46.4	.564	.241	4	49.1	4.97	7.5	11.2	-3.6
Wisc. 623	335	19.0	32.2	47.6	.371	.146	3.2	50.5	5.64	14.3	17.0	-2.6
Wisc. 629	264	17.9	30.4	49.4	.406	.169	2.6	50.5	8.57	7.7	9.7	-2.0
Wisc. 710	354	15.6	27.5	54.9	.720	.359	4.8	42.7	5.34	7.3	10.8	-3.4
Minn. 3866	315	19.6	30.8	46.4	.646	.299	4.5	45.2	5.93	7.3	11.0	-3.6
Minn. 3915	253	17.9	29.2	48.1	.917	.338	5.1	42.1	5.20	5.9	8.7	-2.8

Nebraska Table 1. (continued)

Varieties (Genotypes)		Yield	%Total	Chip	%Oil	%Total	%Red.	PCII	Rd.	%Sol.	Inhib.	Rever.	Stab.
1972		Cwt/A	Solids	Yield		Sugar	Sugar	Color	Value	Prot.DW	Index	Index	Index
B 6097-3	376	20.0		33.2	48.5	.701	.332	4.7	43.0	4.15	6.2	8.1	-1.8
B6495-12	347	19.2		31.8	45.0	.624	.274	4.6	45.2	3.95	7.2	9.8	-2.6
B6495-20	339	20.4		33.4	44.6	.265	.251	3.2	50.3	3.82	5.1	7.6	-2.4
1973													
ND 6634-2R	256	16.8		28.4	40.6	.466	.236	2.8	40.6	5.34	16.7	20.1	-3.4
Minn. 4536	280	16.1		27.4	41.7	.768	.372	4.4	35.0	8.09	9.5	14.2	-4.6
Minn. 4537	293	16.6		28.8	41.6	.829	.411	4.7	34.4	5.57	9.9	14.2	-4.3
Wisc. 626	316	19.3		30.4	38.7	.532	.276	2.8	38.3	5.37	15.9	17.3	-1.3
Wisc. 707	251	17.0		29.1	37.7	.445	.219	2.5	40.3	4.74	14.3	16.3	-2.0
Wisc. 717	264	19.0		31.1	40.6	.384	.171	1.1	40.8	5.07	13.4	16.4	-3.0
Mich. 709	297	17.9		30.0	34.2	.576	.298	4.8	36.7	5.89	14.7	21.1	-6.4
La. 91-157	267	17.4		29.6	36.6	.593	.280	3.5	37.3	5.33	11.8	14.8	-3.0
Neb. 93.55-16	255	19.0		30.3	35.8	.514	.244	3.1	39.4	5.28	10.9	12.4	-1.5
Neb. 47.62-1	245	19.1		29.2	38.9	.516	.253	3.2	39.1	5.61	10.4	11.7	-1.3
Neb. 52.57-1	245	19.0		29.8	35.4	.582	.287	3.2	39.6	5.37	9.0	12.3	-3.3

ANALYSES OF VARIANCE 1972

Source	**	**	**	**	**	**	**	**	**	**	**	**	**
Locations	**	**	**	**	**	**	**	**	**	**	**	**	**
Genotypes	**	**	**	**	**	**	**	**	**	**	**	**	**

ANALYSES OF VARIANCE 1973

Locations	**	**	**	**	**	**	**	**	**	**	**	**	**
Genotypes	**	**	**	**	**	**	**	**	**	**	**	**	**

ANALYSES OF VARIANCE FOR COMBINED 1972 AND 1973 DATA^{1/}

Years	**	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	**	*	**	**	N.S.
Locations	**	**	**	**	**	**	**	**	**	*	**	**	**
Genotypes	**	**	**	**	**	**	**	**	**	N.S.	*	**	**
GXY	**	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	**	N.S.	N.S.	N.S.	N.S.
C.V.	19.4	5.9	5.4	5.4	10.4	29.6	39.6	27.9	10.3	29.6	50.3	49.4	67.8
-	317	17.2	29.6	29.6	45.5	0.662	0.300	3.9	42.3	5.30	10.1	13.7	-3.6
X													

^{1/}For seven varieties and five locations.

As indicated by the analyses of variance, for the combined 1972 and 1973 data and the individual year data, location effects were significant for all factors as might be expected. Genotypic effects were significant for all factors except oil content and protein content (comparable to 1970-71 results). The genotype-year interactions were not significant except for yield and Rd values.

Heritability estimates were calculated from estimates of components of variance (Nebraska Table 2).

Nebraska Table 2. Models for the estimation of components of variance and heritability values.

Analyses of Variance

Source	DF	MS	Components estimated ^{1/}
2 Years	(y-1)=1	M ₁	
17 Locations in Y*	(1-2)=15	M ₂	
7 Genotypes	(g-1)=6	M ₃	$\frac{2}{3}V_e + 1_1V_{gy} + 1_yV_g$
GXY	(g-1)(Y-1)=6	M ₄	$\frac{3}{3}V_e + 1_2V_{gy}$
GXLinY	(g-1)(1-2)=90	M ₅	V_e

$$\begin{aligned} \frac{1}{2} &= \text{Variance for factors} \\ \frac{2}{2/11} &= \text{Sum } 1^2 = 149 = 8.67 \\ \text{Sum } 1 &= 17 \\ \frac{3}{3/12} &= 1/y-1(\text{Sum } 1-1_1) \\ &= 1/2-1(17-8.67) = 8.33 \end{aligned}$$

*1=1972=10; 1=1973=7

V_e = M₅=variance attributed to environment.
 V_{gy} = M₄-M₅/8.33=variance attributed to genotype-year interactions.
 V_g = M₃-(M₄-M₅/8.67)÷34=variance attributed to genotypic effect.
 V_p = $V_g + V_{gy}/2 + V_e/17$ =variance of a phenotypic mean.
 Heritability = V_g/V_p ; $V_p = V_g + \frac{V_{gy}}{y} + \frac{V_e}{1y}$

Genotypic Superiority = $(\bar{P}_s - \bar{P}) \times \text{Heritability}$

\bar{P}_s = mean value for selected genotype

\bar{P} = mean value for all genotypes or standard variety.

Section Index = $(P_{s1} - P_1)H_1 + (P_{s2} - P_2)H_2 \dots (P_{sn} - P_n)H_n$

$P_{s1}, P_{s2} \dots P_{sn}$ = Selected Phenotypes for various factors.

$P_1, P_2 \dots P$ = Phenotypic means.

Heritability estimates were high for all factors (0.35 to 0.88). The estimates are based on total genotypic effect (additive + dominance + epistosis) rather than additive effects only (Nebraska Table 3.). However, since potatoes are asexually propagated and the total genetic effect is reproduced, the estimates can be used to identify superior genotypes on the basis of individual factors or for a combination of factors using selection indices.

Example:

Using Selection Index (I) = $(P_{s1} - \bar{P}_1)H_1 + (P_{s2} - \bar{P}_2)H_2 + \dots (P_{sn} - \bar{P})H_n$
 with P_s = phenotype of selection, \bar{P} = mean phenotype and H =
 Heritability for one or several characters.
 From 1972 and 1973 data:

	\bar{P}	Yield	Solids	Protein	Inhibitions
Highest	P_{s1} :	313 Cwt.	17.2%	5.21%	10.6
Lowest	P_{s2} :	401	20.0	8.09	5.5
	H :	221	15.6	3.82	17.6
		0.78	0.88	0.35	0.52

$$I = (401-313)0.78 + (20.0-17.2)0.88 + (8.09-5.21)0.35 + (10.6-5.5)0.52 = 75 \text{ (genotypic superiority of best possible selection).}$$

Nebraska Table 3. Components of variance and heritability values for quality factors.

	V_e	V_{gy}	V_g	$V_{\bar{P}}$	Heritability
Yield	3774.02	453.06	1597.13	2045.67	0.78
Cwt/A	(0.63) ^{1/}			(5824.21) ^{2/}	(0.27) ^{3/}
Total	1.0457	0.1255	0.9562	1.0804	0.88
Solids	(0.49)			(2.1274)	(0.45)
%	2.5750	0.3091	0.8140	1.1200	0.73
Chip	(0.68)			(3.7800)	(0.22)
Yield	22.5840	2.7112	1.8671	4.5511	0.41
lbs./Cwt.	(0.83)			(27.1623)	(0.07)
Percent	0.0385	0.0046	0.0313	0.358	0.87
Oil	(0.51)			(0.0744)	(0.42)
Total	0.0142	0.0017	0.0055	0.0072	0.77
Sugar	(0.66)			(0.0214)	(0.26)
%	1.2130	0.1456	0.5672	0.7113	0.80
Reducing	(0.63)			(1.9258)	(0.29)
Sugar	19.0510	2.2870	10.8360	13.1002	0.83
%	(0.59)			(32.174)	(0.34)
Soluble	2.4780	0.2975	0.1563	0.4508	0.35
Protein	(0.84)			(2.9318)	(0.05)
% DW	25.9052	3.1099	3.3912	6.4699	0.52
Inhib.	(0.80)			(32.4063)	(0.10)
Index	45.9311	5.5139	9.1964	14.6552	0.63
Rever.	(0.76)			(60.6414)	(0.15)
Index	5.9828	0.7182	1.9402	2.6512	0.73
Stab.	(0.69)			(8.6412)	(0.22)
Index					

^{1/} Percent of variance attributed to environment.

^{2/} V_p = Total phenotypic variance.

^{3/} Heritability for a single trial in a given year.

$I_2 = (221-313)0.78 + (15.6-17.2)0.88 + (3.82-5.21)0.35 + (17.6-10.6)0.52 = -77$
(least desirable genotype).

Range in Indices for two years is 0.75 (Highest) to -0.77 (Lowest).

The data for all four years are being combined to obtain refined estimates of heritability and repeatability to be used for developing Selection Indices for the entire North Central Region and specific locations within the region.

Correlations among the factors of yield, total solids, protein content, sugar contents and chip color will also be determined. Superior selections tested in the Region during the past four years will be identified.

Potato Breeding

Use of True Seedling Transplants. The study involving the use of true seedling transplants versus clonal seedling tubers for first year selection was continued. A population of 2100 C1 generation tubers produced under greenhouse conditions were field grown and 56 selections were made from them. The same population was grown as true seedling transplants in 1973 from which 87 selections were made. The average performance and variation within the two selected groups will be studied in replicated trials in 1975 and 1976.

Variety and Advanced Selection Tests in Arizona. Winter indexing of seed stocks in the breeding program was transferred from Alabama to Arizona in 1974. Five to 10 hills (tuber index) are planted with the cooperation of Dr. Paul Bessey, Department of Horticulture, University of Arizona and Dr. D. Pew of the Mesa Experiment Station. Some 341 named varieties and advanced clones were indexed in 1974. In addition to obtaining disease readings, yield and chip quality (specific gravity and chip color) determinations were made for the 65 most promising varieties and selections (Nebraska Table 4.) The plots were planted on December 27, 1973 on the Blue Goose Farms, Queen Creek, Arizona and harvested May 10, 1974. The season was favorable for high yields and good quality.

Outstate Testing Program. Fourteen new varieties, strains of Norgold Russet and russet selections from Washington were tested in trials at Lincoln (summer crop) and Alliance (fall crop) in Nebraska. One or two replicates of 20 hills were planted at each location in conjunction with the North Central States Regional Trials (reported elsewhere in this publication).

The plot in Lincoln was planted on April 23 and harvested August 28. Sixteen consecutive days of temperatures above 100° F were recorded in July. Low yields and specific gravity, small tubers and heat sprouts resulted from the high temperatures. The plot in Alliance was planted May 22 and harvested September 21. Early Blight was a major problem.

Nebraska Table 4. Arizona potato variety trial. Blue Goose Farms, Queen Creek, Arizona.

Selection	1/ Color	2/ Shape	Total Yield Cwt/A	Ave. Tuber Wt. Oz.	Specific Gravity		3/ Gen. Rating	Comments
					Gravity	Chip Color PCI		
Russet and White Clones								
Norgold	Rus	OF	306	7	1.078	3	3	
Kennebec (check)	W	OO	422	11	1.074	2	1	
Shurchip	W	RF	311	6	1.081	2	1	
Monona	W	OF	226	5	1.080	3V	3	Small
Haig	Rus	RO	247	6	1.083	3	2	
Kennebec	W	OF	316	8	1.082	3U	3	
Superior	W	RO	283	6	1.087	3	2	
Russet Burbank	Rus	LO	247	4	1.088	3	4	Small
Platte	W	RO	347	5	1.076	3	2	Small
Peconic	W	OF	305	8	1.079	4	3	
HiPlains	W	LF	370	11	1.077	2	1	
Jewel	W	OF	303	7	1.073	2	1	
Norchip	W	RO	298	6	1.084	3	1	
Katahdin	W	OF	355	9	1.081	2	1	
Cascade	W	OO	372	8	1.074	3	1	Uniform, Good type
Iopride	W	RO	254	6	1.073	3	2	
FL650	W	RO	270	5	1.077	3	3	Small
FL460	W	RF	156	5	1.072	2	2	
FL162	W	RO	332	6	1.084	2	2	Small
54.66-1	W	RO	288	7	1.078	2	1	
176.69-2	W	RO	296	7	1.083	3	2	
S1-8	Rus	FO	178	5	1.077	2	4	Small
A2.69-3	W	RO	370	8	1.079	2	1	Cracks
31-1	Rus	OO	233	7	1.073	3	3	Deep Eye
1.57-1	Rus	--	302	6	1.074	3	2	Uniform
18.66-2	W	LO	198	7	1.077	3V	3	Large
A156.70	W	OO	234	4	1.080	2	4	Knobs
13.66-1	W	RO	302	8	1.062	4V	4	Uniform
A242.69-1	W	OF	228	10	1.079	2	2	Large
S1-3	W	LO	324	8	1.075	3	1	Long
A147.71-1	W	RO	179	5	1.065	4V	4	Small
17.66-1	W	OF	242	7	1.064	4	4	
8.67-1	Rus	RO	286	5	1.075	3	2	Small
91.57-H18	Rus	LO	232	6	1.065	4	3	
A149.70-1	Rus	RO	288	6	1.064	5V	5	Deep eyes

Selection Russet and White Clones	<u>1/</u>		<u>2/</u>		Total Yield Cwt/A	Ave. Tuber Wt. Oz.	Specific Gravity	Chip Color PCI	<u>3/</u> Gen. Rating	Comments
	Color	Shape								
76.62-1	W	LF			239	7	1.076	3V	2	
A262.69-1	W	OO			330	8	1.078	2V	1	Smooth
A63.71-1	Rus	LF			302	9	1.073	3	1	Smooth
A85.70-2	W	OO			280	7	1.077	3	1	Mature
A129.69-1	W	RO			310	7	1.077	2	1	Uniform
A218.70-2	W	RO			231	7	1.075	2	1	Univorm
A102.71-2	Rus	LF			225	6	1.076	2	2	
Red Clones										
R. Pontiac	MR	OO			280	11	1.077	3V	1	Deep eyes
R. LaSoda	BR	RO			158	4	1.083	2V	3	Uniform
Bounty	MR	RO			252	8	1.080	4	2	Cracks
D.R. Norland	BR	OO			295	6	1.070	2	1	Uniform
Shaver										
Norland	LR	OF			343	7	1.077	3	1	Cracks
Sioux	DR	RO			227	8	1.093	3	2	Uniform
Pioneer	LR	LO			364	9	1.074	-	4	Long
Triumph	LR	RO			230	5	1.073	-	4	Small
49.62-5	BR	RO			274	8	1.089	3V	1	Deep eye
52.57-1	MR	OO			269	7	1.077	4V	1	Good
A179.70-2	DR	FO			236	6	1.084	-	2	Red
A43.69-2	BR	RO			228	5	1.075	-	4	Cracks
A216.70-1	LR	LF			214	6	1.073	-	4	Type
37.65-1	MR	LF			214	5	1.081	3V	2	Long red
219.70-3	BR	RF			280	8	1.083	4	1	
A219.70-1	RB	OO			214	7	1.086	-	3	Smooth
A212.69-1	BR	OO			176	4	-----	-	4	Smooth
A143.70-2	DR	RO			245	7	1.085	4	1	
284.70-1	BR	FO			211	5	1.085	-	3	Mature
A173.69-1	DR	RO			219	6	1.091	5	2	Small
A237.70-3	DR	RO			228	7	1.079	3	1	Mature
A27.70-2	DR	OO			261	6	1.085	3	1	Type
A136.71-1	MR	OF			316	6	1.070	3	2	Type

Nebraska Table 4. (continued)

1/ Color: Rus = Russet, W = White, LR = Light Red, MR = Medium Red, DR = Dark Red,
BR = Bright Red.

2/ Shape: Length/width and thickness/width; F = Flat, length less than width;
R = Round; O = Oval; L = Long (length 2X width).

3/ General Rating: 1 = Excellent type, size and yield; 2 = Good type, size and yield;
3 = Commercially acceptable type, size and yield; 4 = Some off-type and
critical defects; 5 = Poor type and size and/or critical defects.

Nebraska Table 5. Outstate potato variety trials 1974.

Variety	Color	Maturity 1-5	Total Yield	Yield US#1	% US#1	% Scab	Sort Outs	% B&C Sizes	Chip Color (PCII)	Spec. Grav- ity	Comments
<u>Lincoln</u> ^{1/}											
Nooksack	Rus	4	49	0	0	0	0	1.0	-----	-----	Heat sprouts
Snowchip	W	4.5	236	54	23	0	49	26	5	1.071	Knobs, G-cracks
WC285-146	Rus	3.5	71	25	35	0	18	46	-----	-----	Heat sprouts
WC230-14	Rus	4	81	0	0	0	43	56	6	1.077	Off type
Norchip	W	3.4	300	111	37	0	30	32	3	1.091	Off type
<u>Alliance</u>											
Nooksack	Rus	4	118	59	50	0	14	34	5	1.101	Good
Snowchip	W	4	192	38	20	13	26	39	3	1.096	Scab
WC285-146	Rus	4	48	14	28	44	0	26	7	1.100	Scab
WC230-14	Rus	5	172	21	12	53	6	28	8	1.080	Scab
WC285-18	Rus	4	147	56	38	0	3	58	5	1.085	Small +
WC285-83	Rus	4	218	61	28	0	3	67	3	1.100	Small +
WC316-1	Rus	3	171	94	55	0	13	30	7	1.094	Excellent
WC314-2	Rus	5	213	85	40	0	12	46	6	1.106	Good
Wischip	W	2	175	37	21	1	54	22	4	1.085	S-green, knobs
<u>Norgold</u>											
Strains											
<u>Alliance</u>											
Norgold #1	Rus		200	59	29	0	37	31	7	1.085	Scab, knobs
Norgold #16	Rus		215	108	50	0	27	22	7	1.081	Off type
Norgold #109	Rus		240	105	44	0	13	41	6	1.085	Off type
Norgold #1	Rus		221	154	70	0	13	16	10	1.087	Off type
Norchip	W		283	77	27	12	49	11	3	1.088	G-cracks

1/ July temperatures were considerably above normal and unfavorable for growth and tuber development; 16 days above 100°F. were recorded in mid-July; rainfall was considerably below normal.

2/ Severe Early Blight

NEW JERSEY

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Campbell Institute for Agricultural Research

From approximately 50,000 first year seedlings grown at the breeding farm in Perham, Maine, 962 were saved for replanting in 1975. Thirteen hundred and forty-nine clones were planted in 16 hill plots, of which 193 were saved for processing tests and possible replanting. One hundred and sixty-three clones were saved from the 100 hill planting for processing tests and possible replanting in replicated trials.

Data reported are from replicated trials in Maine, New Jersey, and Pennsylvania. Plots consisted of 25 hills spaced ten inches apart, replicated four times. Planting and harvest dates, fertilization, and cultural practices were similar to those practiced in the areas in which the trials were located. Samples from all trials were evaluated for processing characters in laboratories at Cinnaminson, New Jersey, or at Perham, Maine.

Campbell Table 1. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections in the frozen products trial grown at Elmer, New Jersey in 1974.

Selection	Yield over 2 inches		S.G. ^{1/}	Tuber ^{2/} Rating	Tuber ^{3/} Shape	Chip ^{4/} Color	French Fry	
	cwt/A	Percent					Texture ^{5/}	Color ^{6/}
AF22-8	316	88	72	3.2	0 bl	3.7	4.0	3.6
AF22-11	340	92	73	2.8	0	3.4	4.1	3.0
AF24-33	337	83	77	3.0	0	3.2	2.9	2.1
AF25-18	308	82	68	3.0	L bl	3.1	4.4	3.1
AF27-36	325	81	74	3.2	0 fl	4.7	4.6	4.2
AF30-23	346	85	64	3.0	0	4.5	5.0	4.2
AF41-9	341	93	60	3.2	0 bl	3.5	4.4	3.1
CA53-6	378	85	75	3.1	0-R	3.3	3.3	2.3
CA55-24	326	87	74	3.4	0-L	2.9	2.8	1.8
CA60-2	461	94	69	4.1	0 bl	4.3	4.5	3.4
CA60-24	331	89	74	2.9	0	3.5	3.5	3.8
CA61-3	283	74	82	2.6	0	2.9	2.8	2.1
CA67-2	474	94	64	3.4	0-L	3.3	4.0	3.1
CC05-4	349	85	59	3.0	0	3.6	4.5	3.4
CC05-19	375	92	63	3.4	0	3.0	4.2	2.9
CC06-5	385	83	70	3.4	0 bl	3.7	3.8	3.3
CC06-12	271	68	66	3.0	L	3.0	2.8	2.0
CC53-4	322	86	66	3.0	0	4.5	4.8	3.1
CC76-1	306	80	81	3.0	0	3.1	3.0	2.4
Katahdin	316	90	62	3.2	0	4.1	4.8	3.2
Kennebec	395	86	70	3.1	0-L	3.7	3.5	2.0
Superior	324	85	76	3.0	0 bl	3.1	4.2	2.9
Means	345	85	70	3.1		3.5	3.9	
LSD (.05)	NS	7	6	0.2		.6	1.0	
(.01)	-	10	8	0.3		.8	1.2	
CV%	17	6	6	9		11.1	17.1	

1/ 1.0 deleted

2/ 1 = poor to 5 = excellent

3/ 0 = oblong, R = round, l = long, bl = blocky, fl = flat, th = thick

4/ PCII Color scale

5/ 1 = mealy to 5 = soggy

6/ U.S.D.A. color standard

Campbell Table 2. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections grown at Sugar Loaf, Pennsylvania in 1974.

Selection	Yield over 2 inches		S.G. ^{1/}	Tuber ^{2/} Rating	Tuber ^{3/} Shape	Chip ^{4/} Color	French Fry	
	cwt/A	Percent					Texture ^{5/}	Color ^{6/}
BR6446-2	313	94	63	2.8	0 bl	7.1	4.6	3.5
BR6456-1	236	87	70	3.5	0 bl	4.6	4.1	3.4
BR6626-5	275	82	75	3.0	Ob	4.5	4.0	3.8
BR6863-3	236	90	80	3.5	Ob	3.2	3.2	2.8
BR6864-1E	312	79	75	3.0	Ob bl	3.6	3.9	2.4
BR7093-23	299	86	72	3.2	Ob	3.1	3.5	1.9
BR7093-48	217	94	76	3.2	Ob	3.3	2.4	2.2
BR7104-10	246	80	68	2.8	Ob	4.5	4.5	3.8
CA02-13	232	79	65	3.5	Ob bl	3.8	4.4	3.6
CA46-11	321	91	76	3.0	Ob	3.6	3.4	2.8
CA46-34	271	87	71	2.2	Ob bl	4.4	4.7	4.5
CA55-24	201	86	73	2.5	Ob bl	3.0	2.4	2.1
CA60-24	296	93	75	3.0	Ob	3.7	2.9	2.4
CA61-3	215	86	83	2.8	Ob bl	2.9	2.5	2.1
CA67-2	288	91	69	3.2	Ob	4.1	4.1	3.5
CC06-5	283	90	73	3.5	Ob bl	3.5	3.9	3.0
CC06-12	247	78	73	3.0	0-L	3.3	3.6	3.1
CC76-1	243	85	80	3.2	0-L	4.0	3.2	2.4
AF22-8	240	92	69	3.5	Ob fl	4.8	4.1	3.8
AF22-11	237	88	65	2.8	Ob	4.6	4.6	3.4
Katahdin	324	90	74	3.5	Ob	3.6	3.5	3.0
Norchip	279	86	73	2.8	Ob	3.3	3.9	3.2
Superior	242	87	72	3.0	Ob	3.5	4.4	3.8
Wauseon	210	83	70	3.0	Ob bl	3.0	4.4	4.0
Means	262	87	72			3.9	3.8	3.1
LSD (.05)	NS	6	6			.7	.8	.7
(.01)	-	8	8			.9	1.0	1.0
CV%	26	5	6			13	14.5	16.9

1/ 1.0 deleted

2/ 1 = poor to 5 = excellent

3/ 0 = oblong, R = round, L = long, bl = blocky, fl = flat, th = thick

4/ PCII Color scale

5/ 1 = mealy to 5 = soggy

6/ U.S.D.A. Color standard

Campbell Table 3. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections to be evaluated for soups, Perham, Maine, 1974.

Selection	Yield over 2 inches		1/ Specific Gravity	2/ Tuber Rating	3/ Tuber Shape	French Fry		T.G.A. mg/100g.
	cwt/A	Percent				4/ Chip Color	5/ Texture	
CA02-13	368	93	69	3+	0 th	9.3	4.1	6.3
CA23-6	302	90	82	3	0	7.5	3.0	
CA26-4	373	93	68	3+	0 th	9.5	4.8	
CA29-11	321	93	72	3	R-0	8.8	4.1	14.7
CA10-6	304	91	80	3+	R-0	8.5	3.2	
CA10-7	295	91	72	3	0	10.0	4.2	
CA16-11	295	94	76	3	0-10	6.3	3.0	9.3
CA16-31	321	92	66	3	0	8.3	4.5	14.0
CA16-34	314	93	70	3	0	9.8	4.2	7.0
CA53-6	322	92	74	3	R-0	9.9	3.4	
CA60-2	364	91	72	4	0 th	10.0	4.2	
CA60-5	277	92	74	3	R-0	9.8	3.9	12.3
CA60-24	376	92	73	3	0 fl	8.8	3.6	12.7
CA67-2	344	91	71	4	0 th	10.0	4.0	14.0
BR7085-1	286	93	76	3+	10-L	9.3	3.6	5.7
BR7091-1	369	93	60	3	0 th	9.8	4.9	6.3
BR7104-10	370	92	74	3+	0	8.8	4.1	
BR7105-14	332	88	70	3	R-0	9.8	4.2	13.7
Katahdin	295	91	67	3+	oval-0	9.3	4.4	18.3
Wauseon	366	93	71	3	R-0	9.8	4.8	10.0
Mean	330	92	72			9.1	4.0	11.0
LSD (.05)	62	NS	3			1.0	.6	11.1
(.01)	83	NS	5			1.3	.8	4.2
CV%	13	4	3			8	10.7	5.7
							11.4	23

See footnotes on previous tables.

Campbell Table 4. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections to be evaluated for frozen products at Perham, Maine, 1974.

Selection	Yield above 2 inches		Specific Gravity	1/ Tuber Rating	2/ Tuber Shape	3/ Chip Color	French Fry		T.C.A. mg/100g.
	cwt/A	Percent					Texture	Color	
BR7103-2	332	91	76	3	R-0 th	7.3	3.5	2.6	10
CC01-8	222	80	75	2+	O-L0	5.8	2.4	2.0	14
CC01-16	238	84	76	3+	O-L0	7.8	2.2	2.2	17
CC03-5	206	79	79	2+	0	4.5	2.9	2.0	12
CC03-15	280	92	73	4	0	10.0	3.9	3.4	21
CC08-3	307	78	80	3+	O-R	7.3	3.0	2.6	13
CC14-1	299	82	85	3+	LO-R	4.5	2.2	1.4	15
CC56-8	323	93	77	3+	LO-L	10.0	3.7	3.3	23
CD08-21	291	88	79	3	LO-L	6.5	3.4	1.9	12
CD08-22	366	92	75	3	0 th	7.5	3.4	2.8	17
CD08-29	360	91	78	3+	O-R	8.5	3.1	2.4	13
CD34-2	306	90	81	3+	LO-L th	6.3	3.4	2.2	15
CD35-8	232	88	74	3	0	8.3	4.0	3.1	23
CD54-2	272	89	71	3	0	7.3	3.8	2.5	12
CD97-6	269	91	75	3	R-0 th	7.3	3.0	2.8	5
CD106-1	297	91	71	3	R-0 th	9.5	3.1	3.1	7
CD124-1R	278	87	69	4	L-0 bl	9.5	4.4	2.0	16
CD130-7R	274	90	83	3	R-0	6.5	3.0	2.6	5
CD131-14R	300	92	67	5	LO-L bl	8.5	3.9	3.0	19
CD138-2R	264	82	79	3+	LO-R	8.0	3.9	2.6	16
Kennebec	355	88	68	3+	0	7.5	4.6	3.2	21
Raritan	316	86	82	4	0 th	9.8	3.6	3.1	9
R. Burbank	245	82	73	2+	L	9.3	4.2	3.0	
Superior	353	87	71	3+	0 th	8.3	4.1	3.0	
Mean	291	87	75			7.7	3.4	2.6	
LSD (.05)	55	NS	4			1.0	.7	.5	
(.01)	73	NS	5			1.3	.9	.7	
CV%	13	9	3			9	14	13	18

Campbell Table 5. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections in the chip test grown at Perham, Maine, 1974.

Selection	Yield over 2 inches		Specific Gravity	1/ Tuber Rating	2/ Tuber Shape	3/ Chip Color	French Fry		T.G.A. mg/100g.
	cwt/A	Percent					Texture	Color	
BR6863-5E	342	88	78	3	R-0	6.8	3.2	1.6	14
BR6863-8E	326	89	80	3	R-0	7.0	2.6	2.2	10
BR7089-6	355	92	82	3+	O-L0	8.0	2.4	2.5	6
BR7093-5	299	92	66	3	R-0	6.5	3.0	2.8	10
BR7093-20	297	94	79	3	R-0	5.8	3.5	2.1	7
BR7093-23	333	93	74	3	0	7.0	3.4	2.5	8
BR7093-48	293	88	69	3	O-L0	6.0	4.0	2.5	8
BR7108-1	282	90	75	2+	R-0	7.5	3.8	2.6	11
BR7108-2	335	92	77	3	R-0	8.3	3.6	3.0	6
B6965-10	300	90	82	3	R-0	4.3	3.1	2.1	8
B6987-184	329	92	85	2+	R-L0	6.0	2.5	1.9	9
CAC2-7	374	93	68	3	R-0 th	8.3	4.0	3.0	9
CA61-3	278	92	80	3	R-0	4.8	2.4	1.6	9
CD07-22	297	93	68	3	R-0 th	8.0	4.1	2.9	11
CD08-30	246	91	75	3	R-0	7.5	3.6	2.8	10
CD12-18	330	87	78	3	R-0	8.0	2.8	2.4	7
CD15-2	348	93	79	3	R-0 th	6.5	3.5	2.8	
CD50-9	284	86	68	3+	R-0	6.8	3.6	2.8	
CD117-6R	227	90	73	3	R-0	6.5	3.6	2.0	
CD121-1	321	91	75	2+	LO-L	5.8	2.9	2.0	9
CD139-5	287	91	79	3+	R-0	7.3	2.6	2.1	16
CD141-26	29	91	84	3+	0	8.8	3.4	3.2	10
AF14-3	29	91	75	3	0	7.5	3.6	2.8	10
AF127-3R	286	92	77	3+	R-0	6.5	4.0	2.1	10
Kanebec	321	93	66	3	O-L0	7.0	4.1	2.5	13
Norchip	326	90	74	3	R-0	7.8	3.4	2.8	8
Mean	309		76			6.9	2.4	3.3	10
LSD (.05)	48		3			.8	.6	.9	4
(.01)	64		4			1.1	.8	1.2	5
CV%	11		3			9	18	19	24

See Table 2 for footnotes.

Campbell Table 6. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections in the early to medium maturity trial at Perham, Maine in 1974.

Selection	Yield over 2 inches		Specific Gravity	Tuber Rating	Tuber Shape	Chip Color	French Fry		T.G.A. mg/100g.
	cwt/A	Percent					Texture	Color	
BR6316-5	373	92	75	4	0	7.0	3.4	2.1	17
BR7102-4	329	90	73	3	R-0	7.5	3.8	2.9	9
BR7103-1	341	89	70	3	O-L0	7.5	3.5	2.8	9
CA02-8	456	93	60	3	R-0	9.8	4.5	3.4	9
CA26-2	354	93	74	2+	O-0	7.0	3.4	1.6	22
CC54-8	304	90	82	3+	R-0	7.5	3.0	2.1	10
CD100-6R	246	96	70	3+	IO-L	9.5	4.1	3.1	9
CD100-9R	310	92	67	3+	R-L0	10.0	4.4	3.4	7
CD111-9	315	92	69	3	O-L0	9.5	4.1	2.9	13
CD120-8	365	92	66	3+	O th	10.0	4.6	3.4	11
CD138-4R	398	92	69	4	IO L bl	8.5	3.8	3.2	10
CD138-11R	350	91	64	3+	O-L bl	9.0	4.6	3.8	11
AF27-36	325	92	71	3	0	8.3	4.1	3.0	16
AF30-23	302	91	67	3+	R-0	10.0	5.0	3.8	8
694-3Rd	442	93	61	4	R-0	10.0	4.9	4.0	8
Katahdin	298	90	65	3+	Oval	9.3	4.2	3.0	11
Kennebec	331	91	69	3	O-L	6.0	4.5	2.1	18
Superior	349	91	74	3	R-0	7.5	3.6	2.2	7
Mea.1	344	91	69			8.5	4.1	2.9	11
ISD (.05)	53	MS	4			.8	.7	.5	5
(.01)	70	-	5			1.0	.9	.6	7
CV%	11	3	4			6	11	11	25

1/ 1.0 deleted
2/ 1 = poor to 5 = excellent
3/ 0 = oblong, R = round, l = long, bl = blocky, fl = flat, th = thick
L/ PCII Color scale
5/ 1 = mealy to 5 = soggy
7/ U.S.D.A. color standard

Campbell Table 7. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections in the late maturing trial grown at Perham, Maine in 1974.

Selection	Yield over 2 inches		Specific Gravity	1/ Tuber Rating	2/ Tuber Shape	3/ Chip Color	French Fry		T.G.A. mg/100g.
	cwt/A	Percent					Texture	Color	
CALL-13	304	94	65	3+	0-LO th	10.0	4.6	3.2	10
CA28-2	239	88	69	3	L	8.3	3.8	2.6	10
CA63-1	272	90	69	3+	0-LO	7.0	3.8	2.0	13
CC53-4	344	92	69	3+	0-LO	9.8	4.6	3.2	15
CD02-9	348	94	70	3+	R-0 th	10.0	4.4	3.4	7
CD03-12	252	93	71	3	R-0 th	10.0	3.9	3.1	8
CD03-26	320	90	68	3	R-0 th	10.0	4.6	3.4	6
CD07-23	233	90	71	3	R-0	9.3	3.9	3.0	9
CD50-17	233	87	68	3	R-0 sl fl	9.0	4.4	2.9	6
CD51-4	288	89	80	3	0-LO	6.8	2.8	2.4	7
CD70-15	231	89	71	3	0-LO	9.0	4.4	2.9	12
CD70-20	277	87	65	3	R-0	10.0	4.8	3.6	11
CD86-5	197	75	81	2+	R-0 th	8.8	3.1	3.2	8
CD86-8	239	89	82	3+	0 th	8.3	2.8	2.8	9
CD89-2	307	86	73	3	R-0	10.0	4.0	3.1	14
CD106-6	270	87	74	4	0 bl	9.8	4.9	3.9	15
CD106-11	352	82	75	3+	0-LO bl	9.0	3.1	2.9	9
CD137-5R	203	87	79	3	0	7.3	3.8	2.6	5
CD138-3	289	90	77	3	0 sl fl	10.0	3.4	3.6	5
AF9-7R	273	91	70	3+	0 th	10.0	4.6	3.6	8
AF10-8R	258	89	69	3+	0-LO	8.0	4.4	2.6	9
AF20-1	313	90	69	4	0	10.0	4.2	2.6	5
AF20-5	344	90	71	3+	R-0	10.0	4.9	3.9	6
AF22-39	307	88	65	3+	R-0	10.0	4.6	3.2	6
AF30-34	293	92	62	3	R-0	10.0	4.1	3.4	10
K-tahdin	248	90	65	3	Oval	9.0	4.2	3.0	20
Kennebec	360	91	66	3	0-LO	6.8	3.9	1.9	10
R. Burbank	186	82	69	2	L	8.8	4.0	3.2	10

Campbell Table 7. continued

Selection	Yield over 2 inches		1/ Specific Gravity	2/ Tuber Rating	3/ Tuber Shape	4/ Chip Color	French Fry		T.G.A. mg/100g.
	cwt/A	Percent					Texture	Color	
Mean	276	89	71			9.1	4.1	3.0	10
LSD (.05)	59	8	4			.6	.8	.5	6
(.01)	51	11	5			.7	1.0	.7	8
CV%	10	6	4			4	14	12	37

1/ 1.0 deleted
 2/ 1 = poor to 5 = excellent
 3/ 0 = oblong, R = round, 1 = long, bl = blocky, fl = flat, th = thick
 4/ PCII Color scale
 5/ 1 = mealy to 5 = soggy
 6/ U.S.D.A. color standard

Campbell Table 8. Yield, specific gravity, tuber notes, chip color and french fry color and texture for selections in the breeders trial grown at Perham, Maine in 1974.

Selection	Yield over 2 inches		1/ Specific Gravity	2/ Tuber Rating	3/ Tuber Shape	4/ Chip Color	French Fry		T.G.A. mg/100g.
	cwt/A	Percent					Texture	Color	
BR7051-36	145	76	85	3	0	6.5	2.5	1.8	21
BR7086-30	144	88	74	4	R-0 th	7.3	3.3	1.8	20
B6955-14	236	83	83	3	0	10.0	4.2	2.9	18
DT77	238	76	75	3	R-0 sl fl	8.0	4.4	3.0	19
DT153	206	77	70	2+	O-LO	10.0	5.0	3.9	18
G6549-7	199	85	86	3+	R-0	8.5	3.1	3.1	14
ND7103-4	161	90	79	2+	R th	8.0	3.8	3.0	9
ND7196-18	170	80	75	3	R-0 sl fl	8.3	3.9	2.4	11
W330-1	203	78	74	2+	L-LO	10.0	4.1	3.0	10
WC300-4	107	73	71	2+	L-LO	10.0	5.0	3.9	8
WC304-1	179	76	68	3+	O-LO sl fl	10.0	4.4	4.2	6
WC344-2	124	82	80	4	L sl fl	10.0	4.5	3.9	9
WC315-1	85	71	72	3	O sl fl	10.0	3.9	3.6	7
WC316-1	92	81	69	2+	L-LO	10.0	4.4	3.4	12
WC325-1	98	74	70	2	0	10.0	4.8	3.0	9
Hudson	262	89	68	3	R-0	9.3	4.6	3.6	17
Nampa	143	84	73	2+	L-LO	10.0	4.5	4.2	38
Cascade	222	80	69	3	0	10.0	5.0	4.2	20
Katahdin	204	76	69	3	R-0	10.0	4.4	3.1	16
Kennebec	219	78	72	2+	O-LO	8.5	4.4	2.8	30
Norchip	178	88	81	3	R-0	8.5	3.2	2.9	19
R. Burbank	130	82	77	2	L-LO	10.0	4.5	3.4	29
Mean	170	80	74			9.2	4.2	3.2	16
LSD (.05)	55	NS	3			.9	.9	.5	10
(.01)	73	-	4			1.2	1.1	.7	13
CV%	23	14	3			7	14	11	35

See footnotes on previous table.

New Jersey
Melvin R. Henninger

Variety Trials 1974

Location: Vegetable Research Farm, New Brunswick

Field Plot Design:

Table 1. Single row 10' long

Table 2. Randomized Block, 2 reps., 18' long

Table 3. Lattice Square, 4 reps., 21' long

Plant Spacing: All rows were 3' long with seed pieces 9" apart

Fertilizers:

1500 lb/A of 10-10-10 plus 200 lb/A of 34-0-0 sidedress

Dates:

Planted April 17

Harvest August 19-23

Specific Gravity:

Determined by the air and water method

Sp. Gr. = (wt. in air) minus (wt. in water) divided into (wt. in air)

Maturity: 1= very early, 3= medium, 6 = very late

Air Pollution: 9 to 7 = good, 6 to 4 = borderline, 3 to 1 = yield may be reduced

Tuber Color: 0 = white, 1 = buff, 2 = tan, 3 = net, 4 = red, 7 = partly russet,
8 = russet

Tuber Shape: 0 = round, 1 = rd. flat, 2 = oblong, 3 = obl. flat, 4 = obl.-rd.
5 = long flat, 6 = long

Tuber Conformation: 0 = poor to 4 = excellent

New Jersey Table 1. Yields, Sizes, Specific Gravity, Maturity, Air Pollution, and Tuber Color, Shape, and Conformation of 48 U.S.D.A. White Potato Seedlings and Two Varieties Grown in New Jersey, 1974.

Seedling	Yield cwt/A over 1-7/8"	Percentage				Specific Gravity	Maturity	Air Poll.		Tuber			
		Below 1-7/8"	1-7/8"		to 3"			to 4"	Early	Late	Color	Shape	Conf.
			1-7/8"	2-1/2"									
B8185-4	619	4	39	49	8	1.068	3	8	4	0	4	2	
B8281-5	550	9	34	28	30	1.069	2	9	5	7	6	1	
B8352-3	549	4	21	53	23	1.061	4	9	5	1	0	1	
B7828-11	534	3	24	51	23	1.077	4	7	4	0	0	2	
B8280-8	523	8	71	20	0	1.068	3	8	4	8	6	3	
B8185-11	501	5	33	49	9	1.068	3	9	7	0	0	2	
B8289-4	488	5	38	41	16	1.080	5	9	4	0	6	1	
B7516-11	478	4	19	41	36	1.070	3	8	4	1	0	2	
B8306-3	466	5	38	26	31	1.094	3	8	2	2	0	3	
B8392-5	457	3	22	41	35	1.070	5	7	7	2	0	4	
B7783-1	450	2	29	44	25	1.076	1	9	1	1	4	1	
B8302-1	449	3	20	39	39	1.061	2	9	3	0	2	2	
B8222-3	443	6	49	45	0	1.091	3	8	6	0	3	2	
B8285-1	440	3	42	51	4	1.070	6	7	7	8	2	2	
B7633-4	425	2	23	36	39	1.060	0	7	2	0	0	3	
B7680-2	418	10	56	34	0	1.067	1	9	2	1	5	1	
B8210-2	415	2	46	42	10	1.072	3	7	5	8	6	1	
B7902-4	401	2	27	41	30	1.062	3	7	4	0	0	3	
B7862-4	399	2	16	40	42	1.061	3	8	5	0	0	3	
B8393-7	399	1	53	36	10	1.068	4	7	4	1	4	2	
B8393-6	399	5	46	42	8	1.069	4	7	7	0	0	1	
B8372-2	392	3	34	38	25	1.072	3	7	3	0	0	3	
B8193-1	389	11	60	26	3	1.070	2	6	3	7	5	1	
B8185-3	385	6	37	47	10	1.055	2	6	1	0	4	3	
B8306-11	379	6	24	45	25	1.090	4	7	5	1	0	3	

New Jersey Table 1. (Continued)

Seedling	Yield cwt/A over 1-7/8"	Percentage				Specific Gravity	Maturity	Air Poll.		Tuber			
		Below 1-7/8"	1-7/8" to 2-1/2"		to 3"			to 4"	Early	Late	Color	Shape	Conf.
			1-7/8"	2-1/2"									
B7516-1	375	1	27	36	36	1.077	2	7	4	1	0	3	
B8356-1	372	9	59	32	0	1.064	2	8	4	3	2	3	
B8280-5	362	4	45	48	2	1.069	3	7	3	8	2	2	
B8281-4	354	4	43	51	3	1.067	3	9	6	0	6	2	
B8357-1	351	5	40	55	0	1.077	2	7	3	2	2	1	
B8358-6	348	15	28	47	10	1.076	4	9	4	8	0	3	
B8280-11	348	11	66	23	0	1.065	3	8	6	0	6	2	
B8347-2	346	4	19	52	24	1.056	4	7	6	8	2	3	
B8392-4	335	2	22	41	35	1.058	1	8	1	1	0	2	
B8358-1	330	9	49	40	2	1.071	5	7	5	7	6	2	
B7902-7	306	3	22	40	35	1.070	3	8	4	0	4	1	
B8339-4	286	4	42	35	19	1.058	2	8	3	0	6	2	
B7633-1	285	6	38	33	22	1.059	0	7	-	0	2	0	
B7828-3	283	3	40	46	11	1.066	0	7	-	0	1	2	
B8206-2	248	10	53	37	0	1.067	0	7	-	0	0	3	
B8338-6	241	14	54	27	4	1.071	4	8	5	0	2	1	
B8366-4	231	18	79	3	0	1.072	0	8	3	0	6	2	
B7680-1	225	11	59	30	0	1.074	4	7	6	0	0	2	
B7630-16	225	1	10	31	58	1.073	5	6	7	1	2	3	
B8210-1	222	19	81	0	0	1.066	6	9	7	7	5	2	
B8375-2	212	16	76	8	0	1.053	0	6	1	1	6	3	
B8285-3	206	29	62	8	0	1.065	4	9	7	7	6	0	
Superior	312	3	31	50	16	1.067	3	7	5	2	4	2	
Katahdin	333	4	22	42	32	1.062	0	6	4	0	0	2	

New Jersey Table 2. Yields, Sizes, Specific Gravity, Maturity, Air Pollution, and Tuber Color, Shape, and Conformation of 67 U.S.D.A. White Potato Seedlings and Two Varieties Grown in New Jersey, 1974.

Seedling	Yield cwt/A over 1-7/8"	Percentage					Specific Gravity	Maturity	Air Poll.		Tuber	
		Below 1-7/8"		1-7/8" to 2-1/2"		to 3"						
		1-7/8"	2-1/2"	to 3"	to 4"	Over 4"			Early	Late	Color	Shape Conf.
B7871-5	599	2	16	34	28	22	1.064	2	8	2	0	4 1
B7865-12	532	6	34	41	19	0	1.069	2	7	3	0	0 3
B6951-6	505	2	20	39	37	4	1.072	2	8	4	0	0 2
B7632-3	490	3	16	29	49	4	1.060	4	8	6	0	0 2
B8086-3	472	5	34	45	18	0	1.074	4	7	4	0	0 3
B6955-8	467	5	27	59	10	0	1.068	3	6	4	0	0 2
B7845-26	466	5	35	42	15	4	1.068	4	7	5	0	2 1
B7631-5	466	4	23	37	33	4	1.061	1	9	4	0	0 2
B7871-3	457	4	51	41	5	0	1.050	5	8	8	0	0 1
B7650-19	447	3	34	47	17	0	1.048	2	6	3	4	0 2
B7888-7	446	10	48	38	4	0	1.067	4	6	5	1	0 2
B7152-1	436	5	33	38	19	7	1.069	4	7	5	1	0 3
B7939-4	428	9	31	42	18	1	1.066	2	6	5	1	0 3
B7863-6	426	2	12	20	54	14	1.068	3	6	3	0	0 1
B7928-4	426	6	44	47	4	0	1.049	3	6	1	1	0 1
B7910A-6	423	5	29	49	18	0	1.065	3	6	4	0	4 2
B7009-4	418	2	19	44	35	1	1.069	3	9	3	0	0 2
B7858-6	414	7	40	42	13	0	1.075	1	6	1	0	2 2
B7845-10	411	13	48	35	4	0	1.072	3	7	3	0	6 2
B7845-21	401	11	51	32	6	0	1.082	1	6	1	0	6 2
B7845-23	400	6	44	38	13	0	1.071	1	7	3	0	2 2
B8019-7	399	5	41	50	4	0	1.057	4	6	5	0	0 1
B7845-7	397	9	63	25	4	0	1.062	5	7	5	8	6 2
B7744-4	384	2	29	44	23	3	1.066	3	5	3	0	0 1
B8017-6	377	6	33	48	14	0	1.061	5	9	4	0	0 2

New Jersey Table 2. (Continued)

Seedling	Yield cwt/A over 1-7/8"	Percentage				Specific Gravity	Maturity	Air Poll.		Tuber		
		Below 1-7/8"	to		Over 4"			Early	Late	Color	Shape Conf.	
			1-7/8"	2-1/2"								3"
B7024-6	377	4	25	50	23	0	3	9	5	0	3	1
B7828-1	376	4	36	46	15	0	1	6	4	0	0	1
B7888-8	376	5	43	41	11	0	1	6	2	0	0	3
B7768-3	376	4	23	46	27	0	4	7	5	0	2	1
B7024-17	371	2	12	38	42	7	2	8	3	1	0	1
B6987-22	369	2	23	50	25	1	3	6	3	2	0	3
B8018-2	368	7	54	33	7	0	5	8	4	0	0	2
B7910A-11	367	9	59	32	2	0	3	7	4	0	0	2
B7845-9	365	7	61	31	3	0	2	7	3	8	6	2
B7679-9	361	3	32	48	18	0	3	8	3	8	3	1
B7642-2	359	3	30	38	24	7	4	6	5	0	0	2
B7649-5	358	3	26	41	28	4	1	6	3	0	0	2
B7583-19	354	5	16	36	39	6	5	8	5	8	0	2
B8036-4	354	12	50	32	8	0	3	6	3	2	0	3
B7164-26	351	3	28	49	20	1	3	5	2	0	0	2
B7809-5	347	7	66	20	9	0	2	6	3	1	2	1
B7830-4	347	8	45	29	19	0	1	5	3	0	0	2
B7929-8	337	14	58	26	2	0	3	7	6	0	0	2
B8004-8	336	4	40	42	15	0	3	6	3	0	0	3
B6987-57	336	2	23	38	38	0	3	6	3	1	4	1
B8036-3	336	13	54	31	4	0	3	6	5	1	0	2
B7930-5	336	13	68	19	1	0	3	6	3	2	0	3
B7148-1	330	5	36	44	16	0	0	6	-	1	2	2
B7901-5	329	5	40	36	19	1	3	7	4	1	0	2
B8036-1	329	5	34	50	12	0	5	6	4	2	2	2
B7153-29	322	8	42	46	5	0	1	7	3	0	0	2
B7848-23	321	5	25	45	26	0	3	9	5	8	2	2
B7845-14	316	13	56	30	2	0	4	9	5	0	6	2
B7154-6	315	11	65	23	2	0	0	4	4	0	0	2
B6930-6	308	10	58	30	3	0	3	7	3	0	0	2

Seedling	cwt/A over 1-7/8"	1-7/8"		2-1/2"		3"		Over 4"	Specific Gravity	Maturity	Air Poll.		Tuber			
		Below 1-7/8"	to 2-1/2"	to 3"	to 4"	Early	Late				Color	Shape Conf.				
B7863-5	307	3	25	44	28	2	1.073	5	1	0	2	5	4	1	0	2
B7590-1	306	6	41	47	7	0	1.073	3	1	0	2	8	4	1	0	2
B7861-2	303	14	50	35	2	0	1.068	3	8	6	1	4	6	8	6	1
B7772-5	303	5	22	32	36	5	1.067	2	8	3	1	8	3	0	0	1
B8070-7	298	5	21	47	28	0	1.061	3	6	5	2	6	5	1	2	2
B7590-6	298	7	62	28	4	0	1.066	1	7	4	0	7	4	0	0	1
B7139-6	291	7	45	39	8	2	1.077	3	7	3	2	7	3	1	2	2
B7141-1	285	5	30	46	20	0	1.075	3	8	4	0	8	4	0	0	2
B7152-12	283	7	50	40	4	0	1.069	0	6	-	2	6	-	1	0	2
B7863-1	278	6	19	26	31	19	1.073	4	6	5	2	6	5	0	0	2
B7196-23	270	4	37	47	13	0	1.061	1	6	3	2	6	3	8	6	2
B8050-1	261	11	53	31	6	0	1.072	0	6	-	2	6	-	0	0	2
Superior	400	3	33	50	14	0	1.069	3	9	6	2	9	6	2	4	2
Katahdin	326	6	27	39	28	0	1.064	5	7	7	0	7	7	0	0	2

New Jersey Table 3. Yields, Sizes, Specific Gravity, Maturity, Air Pollution and Tuber Color, Shape, and Conformation of 31 U.S.D.A. and 22 Campbell Soup White Potato Seedling and 11 Varieties Grown in New Jersey, 1974.

Seedling	Yield cwt/A over 1-7/8"	Percentage					Specific Gravity	Maturity	Air Poll.		Tuber		
		Below 1-7/8"	to		Over 4"	Early			Late	Color	Shape	Conf.	
			1-7/8"	2-1/2"									3"
B7138-8	535	2	13	34	42	9	1.080	4	8	8	1	0	2
B7629-1	503	2	15	37	43	4	1.061	3	8	6	0	2	1
Penn 71	502	2	20	44	33	0	1.073	2	7	3	0	1	1
Cam67-2	501	2	15	37	41	5	1.060	4	7	6	1	2	2
B7139-4	495	2	12	39	42	5	1.079	4	9	5	0	3	1
B6986-2	494	2	13	32	45	6	1.072	3	8	5	0	0	2
AF20-5	491	3	20	46	30	1	1.066	5	8	7	0	0	2
B7190-2	489	2	19	45	33	1	1.071	4	7	5	0	0	1
Hudson	486	2	11	24	41	22	1.079	5	9	5	0	0	2
CA61-3	485	4	26	42	27	1	1.079	3	7	6	1	0	2
B6987-56	481	3	24	43	29	1	1.081	3	8	3	3	0	3
B7154-10	476	4	28	46	20	1	1.060	2	6	3	1	2	2
B7252-3	474	4	19	39	37	1	1.068	2	6	3	1	0	3
B7694-1	474	4	34	53	8	0	1.080	3	6	3	0	2	3
AF20-1	468	3	20	50	25	3	1.064	3	8	4	2	4	2
BR6864-1E	466	10	39	32	19	1	1.066	3	9	5	0	0	2
CC76-1	464	6	30	47	16	1	1.078	2	7	4	0	2	3
Kennebec	463	6	30	43	17	4	1.071	5	7	5	0	2	1
B7807-2	457	3	25	46	25	0	1.085	3	6	3	3	2	3
BR7103-7	455	1	16	37	41	5	1.079	3	7	6	1	4	3
B7620-4	451	4	21	41	33	2	1.071	4	6	4	1	0	2
B7592-1	445	6	46	41	7	0	1.074	5	9	4	0	6	1
CA60-2	441	4	17	31	37	11	1.065	5	7	3	0	4	2
CC53-4	441	4	24	43	27	2	1.074	3	5	6	1	0	3
B7621-2	440	2	11	35	43	10	1.068	3	6	5	0	4	2

New Jersey Table 3. (Continued)

Seedling	Yield cwt/A over 1-7/8"	Percentage				Specific Gravity	Maturity	Air Poll.		Tuber			
		Below 1-7/8"	2-1/2"		to 3"			to 4"	Early	Late	Color	Shape	Conf.
			1-7/8	2-1/2"									
B6951-1	437	4	37	45	14	1	3	7	2	1	0	3	
B7610-1	435	9	36	45	11	1	3	7	4	3	2	1	
CC06-5	432	4	25	56	15	0	4	6	4	2	0	3	
B6987-2	431	5	21	38	33	2	3	6	5	2	0	2	
Norchip	428	7	36	45	12	1	3	8	3	0	0	2	
CC05-17	426	4	26	49	22	0	4	8	4	0	2	2	
BR7085-1	424	4	28	46	22	0	3	7	2	1	2	2	
Superior	421	3	32	49	14	1	3	9	6	2	4	2	
BR7051-3	420	5	28	37	28	2	4	9	5	1	0	2	
CA60-24	418	3	21	48	27	1	3	7	5	1	4	2	
B7805-1	416	1	12	27	51	9	4	7	3	0	0	3	
B7786-3	406	7	25	41	27	1	4	7	5	1	0	2	
B7573-3	405	5	36	47	12	0	3	8	2	0	2	2	
CC56-8	403	6	33	47	14	0	3	6	4	1	2	2	
CA-55-24	402	4	20	48	28	1	3	8	3	2	2	2	
B6503-2	401	3	31	44	18	3	2	7	3	0	2	2	
AF30-23	401	6	31	46	17	0	4	8	5	0	0	2	
B7619-15	400	3	24	50	23	0	4	6	4	0	4	2	
Keswick	398	3	17	40	35	5	5	9	8	0	0	1	
B7802-2	398	1	16	42	39	1	2	7	4	0	2	2	
AF24-33	395	4	30	51	15	0	4	7	5	0	0	2	
BR6863-3	393	2	20	40	35	3	4	8	4	1	0	3	
CA-46-34	391	2	26	51	21	0	2	6	4	0	2	2	
B7572-4	390	2	19	46	34	0	4	8	7	0	0	3	
Katahdin	388	4	23	47	23	3	5	7	7	0	0	2	

New Jersey Table 3. (Continued)

Seedling	Yield cwt/A over 1-7/8"	Percentage						Specific Gravity	Maturity	Air Poll.		Tuber		
		Below 1-7/8"	1-7/8" to 2-1/2"		2-1/2" to 3"		Over 4"			Early	Late	Color	Shape	Conf.
			1-7/8"	2-1/2"	3"	4"								
B6969-2	378	2	24	42	29	2	1.061	4	7	6	0	4	3	
B7167-2	378	4	27	56	11	2	1.077	3	8	5	0	0	3	
Shurchip	377	5	39	42	13	0	1.066	3	8	6	2	0	2	
CC07-7	367	10	60	29	1	0	1.073	4	9	4	0	2	2	
B7608-2	366	8	44	42	7	0	1.064	2	6	2	8	4	3	
BR6863-8E	366	5	28	43	22	1	1.080	4	9	7	1	0	2	
Pungo	365	5	23	34	34	4	1.077	6	9	8	0	4	1	
Wauseon	361	4	35	39	20	1	1.072	3	6	4	1	0	2	
B7676-2	360	5	43	43	9	0	1.070	2	8	3	8	2	2	
B7160-4	354	10	55	32	3	0	1.069	2	9	3	8	6	2	
B7602-1	350	3	26	51	19	0	1.075	4	8	3	0	0	3	
B6987-43	346	3	14	35	47	2	1.070	3	8	3	0	0	2	
B7587-5	182	14	65	21	0	0	1.062	3	7	2	8	6	3	
Cascade	179	11	27	27	30	6	1.067	5	9	8	0	2	1	
Duncan's Mod.														
LSD 5%	65	2	8	9	10	4	.007							
Coef. of Variability	12	40	22	16	31	132	8							

NEW YORK (LONG ISLAND)

R. C. Cetas

Evaluation of Potato Cultivars and Breeding Lines
for Scab Resistance on Long Island in 1974

Fifty nine cultivars and breeding lines were evaluated for scab resistance at the Long Island Vegetable Research Farm in 1974. The soil was naturally infested with Streptomyces scabies. On October 10, the pH of the soil varied from 5.2 to 5.6 when determined in water and from 4.9 to 5.3 when determined in 0.01N CaCl₂.

The Dithane M-45 (8% active dust) treated seedpieces were hand planted in 10-hill plots on April 30. Each plot was paired with one of the Chippewa cultivar, which was machine planted. The hand planted seedpieces were spaced 12 inches apart in the row and the machine planted ones nine inches apart. All rows were 34 inches apart. The 8-16-8 grade fertilizer (2250 lb/A) and Furadan 10G (30 lb/A in the seed furrow) were applied as the rows were marked with the two-row potato planter. Sprays were applied as needed for the control of foliar diseases and insects. The plants were rotocut on September 17 and the tubers were harvested on September 28.

Forty tubers, or all tubers if less than 40 were available, from each plot were washed and examined for scab lesions. Each tuber was scored 0 (no lesions) to 4 (deep pits) for type of scab present and 0 (no scab) to 5 (61% or more) for surface area covered by scab lesions. These values were converted to individual tuber indices that ranged from 0 (no scab) to 140 (61% or more of the surface area covered by deep pitted scab). The scab index for each plot was calculated by dividing the sum of the individual tuber indices by the number of tubers examined. The index for each cultivar and breeding line in the replicated trial was determined by calculating the average of the two plots. A scab index ratio was calculated for each cultivar and breeding line by dividing the cultivar or breeding line index by the average index of their respectively paired Chippewa plots and multiplying the quotient by 100. The ratios allowed one to determine quickly which cultivars or breeding lines were more or less resistant to scab than Chippewa and to compare one cultivar or breeding line with another.

Although hydrated lime (500 lb/A) was incorporated with the soil prior to planting the potatoes, the pH of the soil was relatively low at the end of the growing season. The low pH of the soil combined with low soil moisture during July (0.60 inches of rain) resulted in the production of smaller than normal tubers and a low incidence of scab, even on tubers of susceptible cultivars. The results (New York (Long Island) Table 1), however, do indicate that several cultivars and breeding lines, such as Cascade, Norchip, Norgold Russet, Targee, Wauseon, NY-54 and K37-1, were highly resistant to scab. Some cultivars and breeding lines, such as Raritan, M11-41, M99-7, M222-5, and M242-10, appeared to be more susceptible to scab than Chippewa, but most appeared to be in the Katahdin-Chippewa range of susceptibility.

New York (Long Island) Table 1. Results of growing cultivars and breeding lines of potatoes in soils that were infested with Streptomyces scabies at Riverhead, New York in 1974.

Cultivar or breeding line	Scab index		Ratio 1/ Line	Type of scab on affected tubers				Percentage of tubers with scab	
	Line	Chipp- ewa		Majority of lesions		Average lesions		Line	Chippewa
				Line	Chippewa	Line	Chippewa		
40 tubers examined from each of two replications									
Abnaki	0.28	0.82	33.3	2	2 - 4	2.0	2.4	11	20
Cascade	0.15	3.05	4.9	2	2 - 3	2.0	2.2	6	35
Hudson	0.50	3.62	13.8	2	2 - 4	2.0	2.6	15	30
Hudson	1.32	0.88	150.0	2	2 - 4	2.0	2.2	36	22
Katahdin	1.02	1.50	68.3	2 - 3	2 - 3	2.1	2.4	25	22
Katahdin	0.80	2.32	34.4	2 - 4	2 - 4	2.1	2.7	22	30
Nampa	0.08	1.20	6.7	2	2 - 3	2.0	2.4	3	22
Nooksack	1.44	3.80	37.9	2 - 4	2 - 4	2.5	3.0	15	30
Norchip	0.05	1.42	3.5	2	2 - 4	2.0	2.4	2	18
Norgold Russet	0.12	3.18	3.9	2	2 - 4	2.0	2.2	6	39
Peconic	0.05	0.92	5.4	2	2 - 4	2.0	2.3	2	22
Penn 71	0.95	2.02	46.9	2 - 3	2 - 4	2.2	2.6	25	26
Raritan	1.98	0.80	246.9	2	2 - 3	2.0	2.3	41	18
Reliance	0.55	1.20	45.8	2	2 - 3	2.0	2.4	15	21
Superior	0.10	1.18	8.5	2 - 3	2 - 4	2.5	2.9	2	15
Targhee	0.00	1.55	0.0	0	2 - 4	0.0	3.2	0	11
Wauseon	0.05	0.90	0.6	2	2 - 4	2.0	3.0	2	8
F58010	0.10	0.95	10.5	2	2 - 4	2.0	2.4	2	15
NY-53	0.88	2.18	40.2	2	2 - 4	2.0	2.6	15	28
NY-54	0.25	4.95	5.0	2	2 - 4	2.0	2.5	10	41
NY-56	0.08	0.45	16.7	2	2 - 4	2.0	2.4	2	11
NY-57	0.15	0.15	100.0	2	2 - 3	2.0	2.2	6	4
K37-1	0.00	0.32	0.0	0	2	0.0	2.0	0	15
K56-2	0.08	0.22	33.3	2	2 - 3	2.0	2.2	2	8
K59-7	0.05	0.25	20.0	2	2 - 3	2.0	2.1	2	8
K357-16	0.22	1.20	18.8	2	2 - 4	2.0	2.5	9	19
L521-5	2.20	1.98	111.4	2 - 4	2 - 4	2.3	2.2	22	31
L521-7	0.18	1.12	15.6	2 - 3	2 - 4	2.2	2.5	5	16

New York (Long Island) Table 1. Continued.

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Cultivar or breeding line	Scab index		Type of scab on affected tubers					Percentage of tubers with scab			
	Line	Chippewa	Ratio ¹ / Line	Majority of lesions		Average lesions		Line	Chippewa	Line	Chippewa
				Line	Chippewa	Line	Chippewa				
Nonreplicated, 40 tubers examined											
M11-11	0.05	1.10	4.6	2	2 - 3	2.0	2.3	2	22		
M11-40	0.00	0.45	0.0	0	2 - 3	0.0	2.2	0	15		
M11-41	1.60	0.75	213.3	2 - 3	2 - 3	2.1	2.2	35	25		
M11-52	0.25	0.30	83.3	2	2 - 3	2.0	2.2	7	10		
M99-7	1.50	0.20	750.0	2	2 - 3	2.0	2.5	30	5		
M99-9	0.40	0.90	44.4	2	2 - 4	2.0	3.0	15	12		
M119-4	0.00	1.45	0.0	0	2 - 3	0.0	2.4	0	27		
M146-3	0.80	1.75	45.7	2 - 3	2 - 4	2.2	2.5	10	25		
M154-27	0.10	1.10	9.1	2	2 - 3	2.0	2.3	5	25		
M177-16	0.45	1.45	31.0	2	2 - 4	2.0	2.9	18	18		
M181-17	0.05	0.35	14.3	2	2 - 4	2.0	3.0	2	5		
M192-12	0.15	0.25	60.0	3	2 - 3	3.0	2.3	2	8		
M195-6	0.00	0.20	0.0	0	2	0.0	2.0	0	8		
M212-11	0.55	0.00	-	2	0	2.0	0.0	18	0		
M214-26	0.05	0.35	14.3	2	2	2.0	2.0	2	18		
M222-5	1.10	0.35	314.3	2 - 3	2 - 3	2.5	2.2	15	10		
M226-7	1.40	2.30	60.9	2 - 4	2 - 3	2.5	2.7	28	28		
M233-19	1.90	0.95	200.0	2 - 3	2 - 3	2.2	2.4	38	12		
M242-10	2.05	0.50	410.0	2	2 - 3	2.0	2.2	55	12		
M242-17	0.95	0.90	105.6	2 - 3	2 - 4	2.1	2.7	25	15		
M281-15	0.80	3.85	20.8	2	2 - 4	2.0	2.4	28	60		
M281-26	1.48	6.25	23.7	2	2 - 4	2.0	2.5	41	72		
M297-17	9.60	6.05	158.7	2 - 3	2 - 3	2.4	2.4	60	68		
M297-31	0.30	9.70	3.1	2	2 - 4	2.0	3.0	10	75		
M298-10	0.06	0.95	5.3	2	2 - 3	2.0	2.4	3	12		
M298-27	0.00	0.15	0.0	0	2	0.0	2.0	0	8		
M299-28	0.45	12.65	3.6	2	2 - 4	2.0	2.9	10	75		
M348-45	2.55	7.00	36.4	2 - 3	2 - 4	2.2	2.9	12	52		

(New York (Long Island) Table 1 continued on next page)

New York (Long Island) Table 1. Concluded.

Cultivar or breeding line	Scab index		Ratio ^{1/}		Type of scab on affected tubers				Percentage of tubers with scab	
	Line	Chipp- ewa	Ratio ^{1/}		Majority of lesions		Average lesions		Line	Chippewa
					Line	Chippewa	Line	Chippewa		
M349-9	4.45	7.60	58.6		2 - 4	2 - 4	2.2	3.0	70	60
M349-17	2.50	12.40	20.2		2 - 3	2 - 4	2.1	2.7	70	82
M349-28	0.35	4.35	8.0		2	2 - 4	2.0	2.6	10	55
M351-17	0.05	2.40	2.1		2	2 - 4	2.0	2.5	2	38
M351-20	0.30	3.45	8.7		2	2 - 4	2.0	2.9	12	38

^{1/} Ratio = Index for cultivar or breeding line divided by index for paired Chippewa plots multiplied by 100.

NEW YORK

R. L. Plaisted and H. D. Thurston^{1/}

The New York breeding program in 1974 was concerned with (1) selection and maintenance of tuberosum clones, (2) production of true seed on the selection from the second cycle andigena population, (3) production of greenhouse seedling tubers of the sixth cycle andigena population, (4) evaluation of disease and insect resistance and chip quality. The growing season was cooler and dryer than normal, however with irrigation available, the yields were considerably above average.

Twenty-nine thousand seedling hills of tuberosum parentage segregating for chipping ability, and golden nematode, Verticillium wilt, and scab resistance yielded 6200 selections. From the 493 first year 10-foot observation plots, 83 were saved. The first yield trial (N's) and 94 entries from which 15 were saved. Six of these are Tub x Adg hybrids (N571, 572, 575, and 576 in Table 1). The second stage yield trial (M's) Table 2, with 34 entries yielded 10 selections. The 11 advanced selections (Table 3) were included in one trial. NY 53, NY 54, NY 56, and K357-16 have been dropped from further testing. The rest are still under consideration.

The selections from the fifth cycle of the advanced andigena population were maintained in a seed plot, evaluated for resistance to aphids, leaf hoppers, Colorado potato beetle, PVS, PVY, scab, Verticillium wilt, and late blight, and for ability to produce acceptable chips. Eleven clones have survived two years evaluation for green peach aphids, 15 for potato aphids, 11 for foliar injury from aphid feeding, and 28 for leaf hoppers. In one year's test on Long Island, 10 clones appeared to be less affected by Colorado Potato Beetle. Dr. Proudfoot of the CDA, St. Johns, Nfld., Canada is evaluating the population of selected clones for resistance to wart. In Dr. Fry's Freeville plot with an artificially produced epiphytotic of late blight, all the tuberosum cultivars were killed whereas 120 of 189 andigena clones were less than 25% defoliated. In the Verticillium wilt test, 68 of 463 appeared to be resistant. Another 68 of the 210 tested for scab in the field on Long Island were scab-free, however, the 1974 test was not a severe one. Of the clones inoculated and evaluated for virus resistance, 61% were resistant to PVY and 86% to PVX. Twenty-four percent of the clones produced chips with acceptable color. Approximately 50,000 seedlings of the sixth cycle were transplanted in the greenhouse to produce tubers. These are now being harvested.

The selections from the second cycle andigena population were intercrossed in the greenhouse, pollinated with bulk pollen from the fifth cycle population, and harvested for open pollinated fruit. On the basis of tuber and virus appearance, resistance to aphids, PVX, and root knot, 647 clones from 439 original accessions will be the basis for the third cycle. The evolution of this population and its structure by geography of origin is given in tables 4 and 5. The erosion in numbers of accessions has occurred in spite of a strong effort to obtain at least one selection from each accession.

^{1/} In cooperation with Anderson, Brodie, Cetas, Ewing, Harrison, Jones, Sieczka, Tingey and Semel.

New York (Breeding Program) Table 1. Selected clones from first stage yield trial -- 1974.

	Yield in cwt/A			% > 2-1/4	Appear- ance	Hollow ² heart (x 1/16)	Internal ³ necrosis (x 1/16)	Specific ⁴ Gravity	GN ⁵	VW ⁶	Chip ⁷
	Total	> 1-7/8	> 2-1/4								
Katahdin	491	485	454	92	4.5	2	0	1.081	+		
Kennebec	505	502	474	94	1.3	0	0	1.082	+	5	
N45-12	465	463	443	95	3.8	1	2	1.070	-	5	U
N61-11	469	457	416	89	4.0	2	0	1.088	-	5	A
N61-25	489	485	454	93	3.8	1	1	1.100	-	6	I
N65-6	425	414	373	88	3.0	4	0	1.079	-	6	A
N85-4	484	484	466	96	4.3	0	1	1.086		2	I
N87-1	422	417	388	92	3.2	2	0	1.075	+	5	A
N566-6	421	416	392	93	4.0	0	1	1.083	+	5	A
N568-19	547	513	477	87	3.0	0	0	1.083	-	5	A
N571-10	582	557	503	86	3.8	0	0	1.081			U
N572-134	420	408	363	86	4.0	1	0	1.074	-	6	A
N572-136	460	428	378	82	3.0	3	0	1.081	-	6	A
N572-271	536	527	491	92	4.0	1	0	1.084	-	2	A
N575-33	467	436	373	80	4.0	0	0	1.079		5	U
N576-5	624	624	595	95	5.0	0	0	1.079	-	3	U
N582-64	465	465	440	95	4.0	0	0	1.079	-		
B6595-5	526	503	469	89	4.5	5	0	1.077	-		

1. 0 is very rough; 5 is very attractive
2. Hollow heart in oversize tubers
3. Internal necrosis
4. Specific Gravity
5. Golden nematode - race A; - = resistant
6. Verticillium wilt: 2 is resistant; 6 is susceptible
7. Acceptable, Intermediate, or Unacceptable chip color in 1973 crop after 50° storage and 6 week reconditioning.

New York (Breeding Program) Table 2. Selected clones from second stage yield trial -- 1974.

		Yield in cwt/A				% > 2 1/4	Appear ¹	Hht ²	Int. ³ necr.	S.G. ⁴ 1.075	VW ⁵ 4	Scab ⁶	GN ⁷	Chip ⁸ 40°/50°
		Total	> 1 7/8	> 2 1/4	> 2 1/4									
Katahdin	Ith	475	462	427	427	90	4.5	2/12	0					
	Riv	506	477	429	429	85	3.8	2/16	0					
	Cato	419	392	329	329	78	4.0	1/16	0					
Hudson	Ith	529	520	499	499	95	3.8	1/12	0	1.075				
	Riv	587	556	510	510	87	4.0	0	0					
Wuuseon	Ith	413	387	340	340	82	3.0	2/12	0					
	Cato	289	257	185	185	64	3.8							
Kennebec	Ith	519	513	489	489	94	1.7	1/12	0	1.081				
	Cato	454	424	346	346	76	1.8							
Monona	Cato	345	326	284	284	82	3.0	2/16	0					
M11-41	Ith	593	554	483	483	81	4.0	4/12	0	1.071	3	S	-	I/A
	Riv	639	553	457	457	72	3.5	0	2/8					
	Cato	651	596	466	466	72	4.0	0	0					
M99-7	Ith	456	438	391	391	86	4.3	1/12	0	1.081	4	S	-	A/A
	Riv	455	426	389	389	85	4.0	0	0					
	Cato	463	422	328	328	71	3.8							
M99-9	Ith	476	457	422	422	89	4.0	0	0	1.079		≠Kat	-	I/A
	Riv	497	469	421	421	85	3.8	2/16	0					
	Cato	389	366	290	290	75	3.5	0	0					
M146-3	Ith	541	523	501	501	93	4.0	3/12	0	1.078	4	R	-	U/A
	Riv	666	630	600	600	90	2.2	2/16	0	Tendency to oversize				
	Cato	724	703	681	681	94	4.0	0	0					
M222-5	Ith	489	477	446	446	91	4.3	0	1/12	1.080		≠Kat	-	U/I
	Riv	467	450	430	430	92	3.8	2/16	0					
	Cato	507	487	449	449	89	4.0	0	0	Tendency to oversize				
M226-7	Ith	489	476	437	437	89	2.7	0	3/12	1.079	5	S	-	A/A
	Riv	574	523	440	440	77	3.0	1/16	2/16					
	Cato	511	480	423	423	83	4.0	0	1/16					

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New York Table 2 (continued).

	Yield in cwt/A				% > 2 1/4	Appear ¹	Hht ²	Int. ³ necr. 1/12	S.G. ⁴ 1.086	VW ⁵ 5	Scab ⁶ S	GN ⁷ -	Chip ⁸ 40 ^c /50 ^a A/A
	Total	> 1	7/8	> 2 1/4									
M297-17	Ith	436	426	392	90	4.3	0	0	1.086	5			
	Riv	571	521	463	81	4.5	1/16	0					
	Cato	447	408	330	74	3.8	2/16	0					
M297-31	Ith	569	558	518	91	4.3	0	0	1.097	4	R	-	A/A
	Cato	579	553	488	84	4.0	0	0					
M348-45	Ith	488	461	405	83	5.0	0	0	1.074	5	R	-	A/A
	Riv	550	500	401	73	2.8	0	0					
	Cato	504	433	319	63	3.8	0	0					
M351-17	Ith	572	535	463	81	4.3	5/12	0	1.083		R	-	U/A
	Riv	638	579	475	74	3.8	0	0					
	Cato	448	369	210	47	4.0	1/16	0					

1. Appearance: 0 = very rough, 5 = very attractive
2. Hollow heart in oversize tubers
3. Internal necrosis
4. Specific gravity
5. Verticillium wilt
6. Resistant or Susceptable relative to Katahdin
7. Golden nematode: - is resistant
8. Chip color: Acceptable, Intermediate, Unacceptable

		Yield in cwt/A			% > 2 1/4	Appear ¹	Hht ²	Int. ³ necr.	Relative to Katahdin			GN ⁷ +	Chip ⁸
		Total	>1 7/8	>2 1/4					S.G. ⁴	VW ⁵	Scab ⁶		
Katahdin	Ith	427	413	382	89	4.4	6/24	0					
	Riv	494	467	423	85	3.8	2/24	2/24					
	Cato	414	393	330	80	4.2	2/16	0					
Hudson	Ith	436	426	407	93	3.3	3/24	1/24	+0.002	=	=	-	U
	Riv	486	460	413	85	4.2	3/24	0					
	Cato	416	390	334	80	3.2	0	0					
NY-53	Ith	411	390	355	86	2.5	1/24	0	-0.002	Res	Res	-	U
	Riv	520	488	429	83	2.6	0	8/24		(3)			
	Cato	411	372	289	70	2.8	0	0					
NY-54	Ith	407	389	359	88	2.7	0	0	-0.001	Res	Res	-	I
	Riv									(4)			
	Cato	458	445	396	86	2.8	0	0					
NY-56	Ith	386	376	352	91	3.0	15/24	0	+0.008	Res	Res	-	I
	Riv									(4)			
	Cato												
NY-57	Ith	461	436	395	85	3.5	2/24	0	+0.002	=	Susc	-*	A(50)
	Riv	582	522	456	82	4.1	1/24	0					
	Cato	528	501	446	84	4.2	0	0					
K37-1	Ith	500	482	437	87	3.3	2/24	0	+0.003	=	Res	-	U
	Riv	514	468	382	74	4.0	2/24	0					
	Cato	499	470	380	76	4.4	1/32	0					
K56-2	Ith	526	517	488	93	4.2	1/24	0	+0.009	=	=	-	U
	Riv	561	528	473	84	4.0	6/24	1/24					
	Cato	392	370	300	77	4.0	0	0					
K59-7	Ith	478	466	445	93	3.5	2/24	2/24	-0.006	=	=	-	U
	Riv	644	604	536	83	3.0	1/24	5/24					
	Cato	432	417	365	84	2.5	1/16	1/16					

New York Table 3 (continued)

	Ith Riv Cato	Yield in cwt/A			$\frac{\% > 2 \frac{1}{4}}{91}$	$\frac{\text{Appear}^1}{4.8}$	$\frac{\text{Hht}^2}{4/24}$	$\frac{\text{Int.}^3}{\text{necr.}}$	Relative to Katahdin			$\frac{\text{GN}^7}{-}$	$\frac{\text{Chip}^8}{\text{A}(50)}$
		$\frac{\text{Total}}{408}$	$\frac{>1 \frac{7}{8}}{397}$	$\frac{>2 \frac{1}{4}}{371}$					$\frac{\text{S.G.}^4}{-.005}$	$\frac{\text{VW}^5}{\text{Susc}}$	$\frac{\text{Scab}^6}{=}$		
K349-7	Ith	550	537	521	95	3.2	10/24	2/24	+ .003	=	=	-	U
	Riv	586	567	533	91	3.6	7/24	0					
	Cato	428	408	359	84	3.0	0	0					
L521-5	Ith	535	512	474	89	3.8	1/24	0	+ .009	Res	Susc	-	U
	Riv	669	617	540	81	3.5	7/24	1/24		(3)			
	Cato	511	469	401	78	5.0	0	0					
L521-7	Ith	526	511	474	90	4.5	4/24	0	+ .006	Res	Res(?)	-	U
	Riv	626	592	541	86	4.3	5/24	12/24		(3)			
	Cato	596	575	529	89	4.2	1/32	0					

1. 0 is very rough; 5 is very attractive

2. Hollow heart in oversize tubers

3. Internal necrosis

4. Specific gravity deviation from Katahdin over years and locations

5. Verticillium wilt: 2 is resistant, 6 is susceptible

6. Scab index relative to Katahdin, more resistant, equal, or more susceptible

7. Golden nematode, race A

*S. vernei resistance. Remainder are adg resistance.

8. Chip color. Acceptable, Intermediate, Unacceptable

NEW YORK STATE

Joseph B. Sieczka

Results of Potato Variety Trials in Upstate New York
1973-1974

Four variety trials were conducted in upstate New York by the Vegetable Crops Department in 1974. Two were conducted at the Vegetable Research Farm at Freeville, New York. The other two were planted on muck soil in Canastota and Savannah, New York. The muckland experiments were grown in cooperation with Mr. Richard Ackerman and Mr. Raymond Nichols, cooperative extension agents.

Nine named varieties and 15 numbered selections were included in Variety Trial I (see Table 1). The entries were spaced at 6, 9 or 12 inches apart within the row. Nine entries produced marketable yields greater than Katahdin. Of the nine, Snowchip was the only named selection. Seven numbered lines from the New York Potato Breeding Program and 6RF1 from the Pennsylvania Potato Breeding Program made up the remainder of the top yielding entries. The highest marketable yield was produced by K357-16. The tubers of this clone are large, round, slightly flattened and slightly irregular. Line L521-7 produced the highest total yield. Tubers of this late maturing line are round and slightly flattened with shallow eyes. Exceptionally bright skinned tubers were produced by K37-1. Other clones noted for brightness were 6RF1, NY53 and Kennebec. Tubers of K56-2 had a tendency toward skinning and MS709 tubers had more bruises than the other entries. Tubers of B6987-56 had the highest specific gravity, tubers of B7196-25 had the lowest.

The numbered russet entries (B7147-6, B7147-10 and B7196-25) produced marketable yields that were slightly lower than Russet Burbank.

Variety Trial II

The numbered entries in Variety Trial II were russet selections from the USDA potato breeding program. These clones were planted in the outside guard rows of Variety Trial I. The appearance of many clones was good, having an oblong to long shape and light to heavy netted skin. Two exceptions were B7157-9 and B7188-2 which had many malformed tubers. Growth cracks were a severe problem in B7655-9 and were a defect in B7637-7. Highest total and marketable yields were produced by B7732-2. Tubers of this clone are round to oblong with shallow eyes and an attractive netted skin. The highest percentage of marketable tubers and the highest specific gravity was produced by B7848-19. Tubers of this line are oblong, have a nicely netted skin and are round in crosssection. None of the russet entries yielded as well as Katahdin.

Muck Soils

Six white skinned entries were included in both experiments conducted on muck soils (see Tables 3 and 4). In both experiments Katahdin, Hudson and 6RF1 produced similar total and marketable yields. However, Hudson produced slightly higher yields when spaced at 6" than when spaced at 9". In addition

to the six entries included in both experiments, three named varieties and two numbered lines were included in the Savannah experiment (see Table 3) and Sebago was added in the Canastota experiment (see Table 4). K37-1 produced the highest total and marketable yields in Savannah. Tubers of this clone are round, shallow eyed and have a bright white skin. The highest specific gravity was produced by 6CX6 and the lowest by Monona. Hudson produced the highest yields at Canastota. Specific gravity differences between varieties were small at Canastota however 6CX6 tubers had the highest reading.

Storage Results

Samples of four field experiments conducted in 1973 were stored at 50° F from time of harvest until January 1974 when chip color and after-cooking darkening ratings were made or until sprouting data were made in March or April 1974. Additional samples from Variety Trial I were stored at 45° F from time of harvest until April 12 when the temperature was raised to 60° F. The samples were chipped May 5, 1974.

The results listed in Table 5 indicate that all entries in Variety Trial I (1973) except J59-10, Cascade and B6887-16 produced light colored chips when stored at continuous 50° F. Light colored chips were produced only by lines from the Pennsylvania Potato Breeding Program (Penn 71, 6RF1 and 6CX6) when the primary storage temperature was 45° F and reconditioning at 60° F took place one month prior to frying. Russet Burbank, Wauseon, B6887-16, and B6698-19 were free of after-cooking darkening. Penn 71 was susceptible to this disorder. Abnaki produced the most sprouts while Russet Burbank, 6CX6 and 6RF1 produced the least.

In Variety Trial II, B7196-25 sprouted the most and B7147-10, B7196-23 and B7196-45 sprouted the least.

Chip color of the entries in the Elba and Canastota experiments did not differ significantly.

Acknowledgements

Seed of the New York entries was obtained from R. L. Plaisted, Cornell University; Pennsylvania selections were obtained from James Watts, Wise Foods; MS709 from N. R. Thompson, Michigan State University; Snowchip from C. H. Dearborn, USDA and all other entries from R. E. Webb, USDA.

The cooperation of J. Coulter, Lopex Bros., R. Ackerman and R. Nichols is appreciated.

Upstate New York Table 1. Variety Trial I. Freeville, N.Y. 1974^{1/}

Variety	Spacing	Total Yield (cwt/A)	cwt/A 2-4"	% of Total Yield			Mean Tuber Wt. (oz)	Specific Gravity	Vine Maturity	% of Total Yield	
				2-3 1/4	3 1/4-4	>4				Mis.	Sunburn
K357-16	9"	517	462	45	44	2	7.3	1.074	4	0	6
L521-7	9"	537	445	44	38	5	6.2	1.079	1	0	5
K59-7	9"	478	409	55	30	1	6.1	1.072	4	0	7
NY57	9"	479	402	51	33	2	6.1	1.081	1	1	6
K37-1	9"	482	401	67	16	0	5.0	1.080	6	1	3
6RF1	9"	465	393	70	14	1	4.9	1.077	1	0	3
NY53	9"	446	389	74	13	0	5.1	1.073	7	0	2
K56-2	9"	446	379	67	18	2	5.6	1.073	2	1	3
Snowchip	9"	454	364	71	9	1	4.5	1.084	4	0	4
Katahdin	9"	446	361	57	24	2	5.7	1.076	6	0	9
B6987-56	9"	441	360	65	17	0	4.8	1.086	7	1	3
L521-5	9"	468	357	52	24	0	5.3	1.081	1	0	13
Kennebec	6"	454	346	67	9	1	5.5	1.083	7	3	8
MS709	9"	413	326	51	28	1	5.7	1.074	6	3	6
Cascade	6"	432	324	67	8	0	4.5	1.073	9	1	4
Norchip	9"	394	313	66	13	0	4.5	1.081	8	2	4
Hudson	6"	420	304	48	24	3	5.7	1.075	7	1	17
Monona	6"	381	297	69	9	0	4.2	1.072	9	0	2
6CX6	9"	363	294	64	17	0	4.8	1.083	5	2	5
Penn 71	6"	354	279	66	13	0	5.2	1.079	8	2	8
Rus. Burbank	12"	393	277	66	4	0	5.0	1.079	3	6	2
B7147-10	9"	432	263	58	2	0	4.7	1.084	5	2	15
B7147-6	9"	300	254	65	20	1	6.0	1.079	3	3	2
B7196-25	9"	289	224	72	5	0	4.8	1.067	9	1	1
D _(.05) Tukey		(107)	(119)				(1.2)	(.007)			

^{1/} Planted May 14, 1974, between row spacing 34", 1500 lbs/A of 10-20-20 applied in bands at planting, killed September 9, 1974, harvested September 24, 1974, 4 replications. Plot size = 2 rows x 12'.

^{2/} Vines rated for maturity on September 5, 1974 on a scale of 1-9; 9 = completely dead, 1 = completely green.

Upstate New York Table 2. Variety Trial II. Freeville, N.Y. 1974^{2/}

Variety	Yield (cwt/A)		% Total Yield		Mean Tuber Wt. (oz)	Specific Gravity	Vine ^{2/} Maturity	% Total Yield	
	Total	2"-4"	2-3 3/4	3 3/4-4				Mis.	Subtotal
B7732-2	402	344	47	38	6.0	1.071	5	2	-
B7846-19	338	333	41	44	7.2	1.076	4	-	-
B7188-2	337	277	50	32	6.6	1.069	6	3	-
B7655-9	363	233	45	23	4.8	1.062	8	17	-
B7637-7	285	223	49	30	5.8	1.068	5	5	-
B7645-5	306	221	70	2	3.5	1.068	6	1	-
B7157-9	283	212	72	3	5.5	1.069	5	4	-
B7644-1	310	192	57	5	3.9	1.071	8	1	-
B8151-1	296	162	41	13	5.0	1.060	8	7	28
D _(.05) Tukey(115)	(124)			(2.3)		(.005)			
Katahdin ^{3/}	546	423	57	20	4.2	1.074	4	-	22

^{1/} Planted in guard rows of Variety Trial I. Planted May 14, 1974, between row spacing 34", within row spacing 9", plot size 1 row x 10', 1500 lbs/A of 10-20-20 applied in bands at planting, vine killed September 9, 1974, harvested September 24, 1974, 4 replications.

^{2/} Vines rated for maturity on September 5, 1974 on a scale of 1-9; 9 = completely dead, 1 = completely green.

^{3/} Means of 2 replications.

Upstate New York Table 3. Variety Trial on Muck Soil Savannah, N.Y., 1974 1/

Variety	Yield (cwt/A)		% of Yield		Culls	Specific Gravity
	Total	>2"	<2"	>2"		
K37-1	591	567	3	96	1	1.072
NY57	536	515	4	96	-	1.078
Katahdin	551	500	4	91	3	1.072
6RF1	524	495	4	94	2	1.069
Hudson	499	480	3	96	1	1.074
6CX6	493	457	5	93	3	1.081
Wauseon	467	450	3	96	1	1.072
Penn 71	425	407	3	96	1	1.075
Abnaki	395	381	3	97	-	1.075
Monona	410	378	8	92	-	1.067
Norchip	378	348	7	92	1	1.076
D (.05)						
Tukey	(114)	(125)				(.005)

1/ Planted May 22, 1974, between row spacing 34", within row spacing 9", plot size 2 rows x 12', 667 lb of 15-15-15 applied in bands at planting, harvested September 27, 1974.

Upstate New York Table 4. Variety Trial on Muck Soil, Canastota, N.Y., 1974 1/

Variety	Yield (cwt/A)		% of Yield		Culls	Specific Gravity
	Total	>2"	<2"	>2"		
Hudson 6"	361	299	10	83	7	1.063
Hudson 9"	319	247	10	77	13	1.062
Katahdin	325	238	8	73	19	1.061
6RF1	308	188	17	61	22	1.063
Sebago	242	176	14	73	14	1.060
6CX6	272	173	17	64	19	1.065
Wauseon	277	168	23	61	16	1.061
Norchip	245	134	22	55	24	1.060
D (.05)						
Tukey	(67)	(84)				(.004)
Penn 71 2/	304	188	17	61	22	1.065

1/ Planted May 28, 1974, between row spacing 34", within row spacing 9" except for Hudson which was planted at 6" and 9", plot size 2 rows x 12', 4 replications, harvested October 24, 1974.

2/ Means of 3 replications.

VARIETY TRIAL ON MUCK SOIL

Canastota, New York, 1974^{1/}

Variety	<u>Yield (cwt/A)</u>		<u>% of Yield</u>		Culls	Specific Gravity
	Total	2"	2"	2"		
Hudson 6"	361	299	10	83	7	1.063
Hudson 9"	319	247	10	77	13	1.062
Katahdin	325	238	8	73	19	1.061
6RF1	308	188	17	61	22	1.063
Sebago	242	176	14	73	14	1.060
6CX6	272	173	17	64	19	1.065
Wauseon	277	168	23	61	16	1.061
Norchip	245	134	22	55	24	1.060
^D (.05) Tukey	(67)	(84)				(.004)

Penn 71 ^{2/}	304	188	17	61	22	1.065

^{1/} Planted May 28, 1974, between row spacing 34", within row spacing 9" except for Hudson which was planted at 6" and 9", plot size 2 rows x 12', 4 replications, harvested October 24, 1974.

^{2/} Means of 3 replications.

Upstate New York Table 5. Variety Trial I, Freeville, N.Y., 1973, Chip Color and Storage Results.

Variety <u>1/</u>	Chip Color <u>2/</u>		After Cooking Darkening Rating <u>3/</u> 3/26/74	Sprout Wt. as % of Total Wt. 3/10/74
	1/20/74	5/10/74		
Abnaki	55	30	4.7	9
J59-10	50	24	4.5	3
Cascade	41	17	4.3	6
Kennebec	69	53	4.6	5
B6887-16	42	23	5.0	7
Monona	60	40	4.5	3
6RF1	66	60	4.7	2
Hudson	55	34	3.9	5
Penn 71	73	60	3.3	5
B6698-19	62	51	5.0	6
Wauseon	56	16	4.9	8
Katahdin	56	31	3.8	4
6CX6	64	68	4.3	2
Rus. Burbank	68	51	4.9	2
Norchip	64	47	4.2	6
D(.05) Tukey	22	22	1.2	4

1/ Varieties ranked in descending order of U.S. No. 1 (2-4") yields (see 1973 report).

2/ Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.2 gave readings of 0 and 100 respectively. Higher values indicate lighter chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65. Samples fried on January 20 were stored at 50°F from time of harvest. Those fried on January 8 were stored at 45°F from time of harvest until April 12 when the temperature was raised to 60°F.

3/ Five tubers of each of the three field replications were peeled, dipped in 0.5% sodium bisulfite; cooked for 7 minutes in an autoclave at 15 p.s.i. and rated from 1-5, where 1=severe after-cooking darkening, 5=no darkening.

Upstate New York Table 6. Variety Trial II, Freeville, N.Y., 1973 1/

Variety	Sprout Wt. as % of Total Wt. 4/27/74
Katahdin	4
B7147-6	4
B7196-1	7
B7147-10	3
B7196-25	11
B7196-45	3
B7196-37	8
B7196-73	4
B7196-20	6
B7196-23	3
B7188-56	7
D(.05) Tukey	(6)

1/ See footnote 1/, Table 5.

VARIETY TRAIL II
 Freeville, New York, 1973^{1/}

Variety	Sprout Wt. as % of Total Wt. 4/27/74
Katahdin	4
B7147-6	4
B7196-1	7
B7147-10	3
B7196-25	11
B7196-45	3
B7196-37	8
B7196-73	4
B7196-20	6
B7196-23	3
B7188-56	7
D _(.05) ^{Tukey}	(6)

^{1/} Varieties ranked in descending order of U.S. No. 1 (2-4") yields (see 1973 report).

Upstate New York Table 7. Variety Trial on Muck Soil in Elba and Canastota, N.Y., 1973

Variety	Chip Color <u>1/</u>	
	Elba	Canastota
Abnaki	56	50
Penn 71	63	--
Katahdin	60	59
6RF1	54	53
Wauseon	59	55
Hudson	51	51
D(.05) Tukey	NS	NS

1/ Determined in the manner outlined in footnote 2/, Table 5. Samples were stored at 50°F since time of harvest and fried on January 23 and 24, 1974.

NORTH CAROLINA

F. L. Haynes

Breeding Program

Breeding for early maturity, chipping quality, resistance to common scab, and adaptation to the Coastal Plain are the primary objectives of the program. Chipping quality is the most important attribute other than yield since most of the late spring crop is processed. Production for fresh market is relatively minor in most years.

Seedling Production and Maintenance. The summer hybridization program failed. Ten days of hot weather at blossom time caused pollen abortion and blasting of flowers. Segregating populations will be entirely from the USDA program in 1975. Over 15000 segregates from 120 families were grown in the field in 1974. Fifteen families were grown from transplanted seedlings. Direct transplanting of seedlings to the field will be used more extensively in the future. All selected clones were grown for maintenance and increase at a mountain station.

Eastern Trials. Selected clones were tested at four locations in the early commercial area. A primary trial of 46 clones was conducted at the Tidewater Station and three advanced trials are reported in tables 2 through 4. The evaluation of clones for reaction to common scab is conducted by a cooperating plant pathologist and is not reported here. All advanced trials received excessive rainfall throughout the season, causing heavy weed infestations late in the season. None of the herbicides used were effective in controlling weeds in June.

The clone 64C2-3 continued to produce superior yields and chips. This clone is being increased for release. The variety Wischip appears promising for this area and will be more extensively tested.

Adaptation Study

The project of adaptation to this region of S. phureja and S. stenotomum was expanded. Both the segregating seedling populations and the selected tuber population were increased. The segregating population included 12,000 seedlings of 60 families of which 41 completed the fourth cycle of selection.

The evaluation for tuberization included 33 clones selected in 1973. All tuberized under long days in August. A trial was conducted comparing performance after 100 days of 120 seedlings of each of nine families from both 1969 remnant seed (the end of one selection cycle) and 1973 seed (the end of three cycles). The results are summarized in table 1. It should be emphasized that the 120 seedlings for each family were randomly chosen from open-pollinated seed produced on mass selected clones, thus no selection for yield per se had been made.

The evaluation of families for dry matter was continued. A total of 461 clones in ten families were measured. As in 1973, there was a wide variation within

families and many clones exhibited very high dry matter. The average for all clones was lower than in 1973 and the clone highest in d.m. was also lower. The best clone in 1974 measured 27.2 percent d.m. compared to a high of 31.6 percent in 1973. These were not measurements of the same clone. The best of the ten families produced 13 of 31 segregates with 20 percent or greater dry matter. The range for this family was 13.1 to 24.4 percent. The generally lower dry matter content was attributed to relatively less ideal growing conditions than in 1973.

North Carolina Table 1. Progress in adaptation through 2 cycles of mass selection in 9 families of 2 highland tropic diploid species. Plots were 1 row by 30 hills, 4 replications. Plants set 6/11/74, harvested 9/19/74 (100 days) at Fletcher. Plants produced from 1969 (remnant) seed and 1973 seed.

Family & Species	Percent Hills Tuberized		Ave. Number Tubers/Hill ^{1/}		Ave. Weight (GMS) Tubers/Hill	
	69	73	69	73	69	73
66P1 (PHU)	80.8	90.8	27.96	45.50	144.2	250.0
66P3 (PHU)	82.5	96.7	37.81	37.07	145.1	270.8
66P8 (PHU)	85.8	93.3	43.58	38.90	176.6	243.6
66P11 (PHU)	78.3	93.3	40.42	34.36	183.1	238.6
66P15 (PHU)	87.5	97.5	28.81	27.00	155.2	307.3
66P17 (PHU)	77.5	93.3	32.18	40.13	98.8	255.1
66P26 (STN)	80.0	94.2	30.93	59.06	122.5	244.5
66P27 (STN)	72.5	94.2	27.56	42.41	149.0	230.4
66P29 (STN)	80.8	91.7	32.08	45.48	168.9	264.5

^{1/} Measurement was made of the best 20 hills in each plot.

North Carolina Table 2. Potato performance trial at Aurora. Plots were 2 rows by 20 ft., 4 replications. Planted 3/13/74, harvested 6/25/74 (103 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 1100 lbs/A 15-15-15.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear ^{2/} ance	Maturity
B6973-N4	309	92.1	1.051	6.0	7.7	Med. early
B7031-N2	282	95.8	61	5.6	8.0	Med. early
64C2-3	281	92.2	57	4.4	7.5	Med. early
B7127-N18	267	93.6	64	4.0	8.2	Midseason
Pungo	254	95.4	70	4.8	6.7	Midseason
B7127-N22	250	92.9	69	4.8	8.0	Med. early
Wischip	250	93.3	63	2.6	7.2	Early
B7127-N2	246	95.5	60	4.4	7.7	Med. early
Cobbler	245	90.3	69	5.0	6.2	Med. early
B6959-N1	244	91.4	65	4.4	7.0	Med. early
Superior	234	94.4	63	4.2	8.5	Early
71C15-20	231	95.8	85	3.4	7.7	Mid season
71C4-5	230	91.9	72	3.0	7.5	Med. early
Norchip	226	93.6	71	2.8	7.5	Med. early
B7127-N9	220	96.0	70	3.8	8.0	Med. early
B7337-N5	220	92.1	68	4.4	8.5	Early
B6597-N3	187	94.1	70	4.2	7.5	Med. early
B7033-N4	104	83.9	-	-	8.7	Early
L.S.D. .05	35	3.4			.6	
C.V. (PCT)	10	2.6			5.9	

^{1/} Chip color determined by Wise Foods, Borden, Inc., Berwick, Pa. Average of 5 samples, 1 per week for 5 weeks following harvest. 1-4 acceptable with grade 1=perfect; 5 usable but not desirable, 6-14 unacceptable with 14=black.

^{2/} Appearance

1 = Very poor 7 = Good
3 = Poor 9 = Excellent
5 = Fair

North Carolina Table 3. Potato performance trial at Weeksville. Plots were 2 rows by 20 ft., 4 replications. Planted 3/15/74, harvested 7/3/74 (110 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 1500 lbs/A 10-20-20.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear- ^{2/} ance	Maturity
64C2-3	253	95.4	1.060	4.3	8.0	Med. early
Pungo	252	90.9	70	5.0	7.0	Midseason
ND7196-18	232	87.0	64	5.0	8.0	Med. early
Wischip	226	90.7	64	3.3	9.0	Med. early
B7127-N22	193	93.8	63	4.8	8.0	Midseason
B6973-N4	188	91.5	52	5.3	9.0	Med. early
Norchip	188	91.2	68	3.0	8.0	Med. early
71C15-20	186	90.2	56	5.8	8.0	Midseason
Cobbler	184	83.9	64	5.3	6.0	Med. early
B7031-N2	183	94.7	61	5.5	8.0	Med. early
71C4-5	173	86.3	72	4.8	8.0	Midseason
B7127-N2	173	94.6	-	-	8.0	Med. early
B7337-N5	168	91.6	66	4.8	8.0	Med. early
B6959-N1	159	79.1	63	5.0	8.0	Med. early
B7127-N18	151	91.5	-	-	8.0	Med. early
Norland	143	92.2	58	4.0	9.0	Early
Superior	138	91.9	65	5.3	9.0	Early
B7127-N9	138	91.8	69	5.0	9.0	Early
B6597-N3	122	92.1	67	4.3	8.0	Med. early
B7033-N4	72	86.4	-	-	8.0	Early
L.S.D. .05	36	.7				
C.V. (PCT)	14	.6				

^{1/} and ^{2/} See footnotes, N.C. Table 2.

North Carolina Table 4. Potato performance trial at Columbia. Plots were 1 row by 20 ft., 4 replications. Planted 3/14/74, harvested 6/28/74 (106 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 1500 lbs/A 10-20-20.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear- ^{2/} ance	Maturity
Pungo	271	85.5	1.061	3.8	7.5	Midseason
64C2-3	253	83.6	61	2.8	8.5	Early
B7031-N2	240	90.8	58	5.5	9.0	Early
71C4-5	233	89.3	69	1.8	8.0	Med. early
B7920-N1	229	85.4	60	5.0	8.0	Med. early
B6973-N4	227	85.8	53	4.3	9.0	Early
71C8-20	216	86.9	63	3.0	7.2	Med. early
71C15-20	210	90.1	73	2.5	8.0	Med. early
B6959-N1	207	80.6	60	5.0	8.0	Med. early
58C19-1	199	82.6	62	3.8	7.5	Med. early
68C6-1	195	88.8	57	2.8	8.2	Early
Superior	186	91.9	65	3.8	8.0	Early
B7127-N2	186	82.2	60	4.5	9.0	Early
B7127-N22	180	81.1	60	4.0	7.5	Med. early
Norchip	176	82.6	64	2.8	7.2	Early
B7127-N18	174	88.2	63	3.8	7.5	Early
71C8-15	174	86.8	68	2.5	7.0	Midseason
71C8-11	170	88.1	65	3.8	7.0	Med. early
B7336-N16	168	92.1	63	3.5	8.0	Early
71C2-1	167	87.9	58	2.5	8.2	Early
71C8-18	163	81.8	-	-	7.7	Med. early
B7987-N1	153	84.8	57	5.5	7.5	Early
71C8-5	151	83.6	71	2.0	9.0	Early
69C5-1	149	86.5	62	5.3	8.0	Early
B7918-N7	147	85.6	57	4.8	7.5	Early
B7337-N5	146	82.0	66	4.3	9.0	Early
71C8-19	146	79.8	69	2.5	7.5	Med. early
B7127-N9	145	90.3	69	3.8	7.5	Early
71C8-26	144	82.0	69	2.3	9.0	Early
71C8-8	135	82.9	67	3.0	8.0	Early
B7930-N2	125	80.5	65	4.5	7.0	Med. early
B6597-N3	120	87.5	68	2.8	8.0	Early
71C15-6	114	81.2	68	3.0	7.2	Med. early
B7881-N3	99	71.6	77	2.8	9.0	Early
B7033-N4	77	75.6	-	-	7.0	Med. early
71C13-10	54	71.4	-	-	8.0	Midseason
L.S.D. .05	47	9.7			.5	
C.V. (PCT)	19	5.9			4.6	

^{1/} and ^{2/} See footnotes, N.C. Table 2.

NORTH DAKOTA

R. H. Johansen, J. E. Huguelet and Bryce Farnsworth

Breeding Program

Potato Crossing and Seedling Production. Two hundred and twelve potato crosses were made in the greenhouse during March, April and May, 1974. The crosses made were from parents having good russet skin, good red color, disease and insect resistance, good type and shape and good processing qualities. The progeny numbering system was changed in 1974 by going back to the number one (1-211 were the crosses made in 1974). In the greenhouse 42,000 seedlings were grown during the summer. In order to expand the program additional space was obtained from the North Dakota Seed Department. The seedling tubers were harvested in the fall and the first size tubers will be planted at Langdon in the spring of 1975. The number two and three size seedling tubers will be sent to California and Texas and planted there. This is a cooperative program that should benefit the NDSU program and the program in Texas and California. Thirty-one thousand, seven hundred and ninety-one seedling tubers were planted in the field at Langdon and 634 saved at harvest for further study and evaluation. The selection of seedlings hills at Langdon is the most critical part of the potato breeding program.

Advanced Selections. The advanced selections at Grand Forks were planted on May 31 and at Casselton on June 5th and 6th. This is the latest the plots have been planted since 1962. Four hundred and seventy-one second year, one hundred third year and fifty-four fourth year and older selections were planted in plots at Grand Forks, Fargo and Casselton. In addition several breeding lines and selections from other states and Canada were also planted at Grand Forks. At Casselton several promising lines were planted from tubers that were indexed in Florida and Alabama during the winter of 1974. Increased material from these stock and other non-indexed material will be used for increase, variety trials and adaptability tests in other states. The plots at Grand Forks were harvested on September 19 and at Casselton on October 3, 4, and 7th.

Promising Selections. Several advanced North Dakota selections appear to be promising either as varieties or as parents. They are ND8888-2, 889103, 8913-4Russ, 8914-5Russ, 8947-2Russ and 9086-1. Line ND7710-5, ND7878-1 showed promise as chipping varieties however, recent tests have also shown them to be very susceptible to vascular and internal discoloration. Line ND8913-4Russ and 8914-5Russ have Norgold Russet in their parentage and they also resemble their parent variety in many ways, such as uniformity and russetting. Further tests are needed for these two selections to determine whether they are more or less susceptible to hollow heart than Norgold Russet and to determine if they are longer in type and better yielders.

Line ND6634-2R was named Bison in 1974. Approximately 100 acres of this bright red variety were grown in 1974 and it is anticipated that quite a few cwt. of Bison will find their way to the fresh or wash market in the fall of 1975. For all practical purposes ND7196-18 will be dropped as a prospective variety. It seems like this white selection had limited adaptation and sets too heavy for dry land conditions.

Processing and Culinary Tests. All new white and russet skin selections are tested for chip quality by the Processing Lab at East Grand Forks. These selections are usually tested during the second year of propagation. If they show promise as potential chipping varieties additional processing tests such as flaking and french frying is done. In 1973-74, 145 advanced selections were tested and 46 had an agron reading of 40 or more. Several other chipping tests were done on the more advanced selections.

Chipping and cooking tests are done by the horticulture department on all promising selections tested in the state-wide variety trials at Park River and Grand Forks. These samples were chipped on January 15 out of 40°F temperature and on January 29th, February 5th and February 12th after being stored at 70°F, North Dakota Table 1 and 2. Cooking tests consisted of boiling and baking 21 entries grown in the trials at Grand Forks and Park River. Samples were tested for sloughing, mealiness, texture and color - North Dakota Table 3 and 4.

Ten selections were tested by the Pillsbury Company for mash and flake quality. Five were tested for chip quality by the Wise Potato Chip Company.

Variety Trials. Replicated variety trials were again grown at Park River, Grand Forks, Minot, Williston and Carrington dry land and Carrington irrigation. Mr. Ben Hoag was in charge of the Minot trial and Mr. Ernest French the Williston trial. Mr. Howard Olson was in charge of the Carrington trial while at Park River, Mr. Wayne Grinde and Jerry Hubner were in charge. At Grand Forks Mr. Don Uhler was in charge of general maintenance of the trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block. Twenty-four entries were tested at Grand Forks and Park River, 16 at Carrington and 12 at Minot and Williston. Marketable yield consisted of all US No. 1 tubers over 1-7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing, fertilizer, soil type, planting and harvest dates of each location were as follows:

Location	<u>Spacing</u>		Fertilizer	Soil Type	Planting Date	Harvest Date
	Row	Plant				
Grand Forks	38"	12"	300#/A 20-20-10	Bearden clay loam	5/31	9/26
Park River	36"	12"	300#/A 20-20-10	Glyndon silt loam	5/28	9/17
Minot	36"	14"	44-38-0	Williams loam	5/17	9/27
Williston	36"	16"		Williams loam	5/28	9/19
Carrington (Irrig.)	36"	8.1"	900#/16-20-6	Loam	5/28	10/10
Carrington (Dryland)	36"	16"	900#/16-20-6	Loam	5/23	10/9

A very unusual weather pattern occurred during 1974. In the spring it was very wet and rained almost every other day, then after June 15 it became very dry and remained so throughout the season. The wet spring delayed planting until the last week in May and the first two weeks in June. Very little precipitation occurred from June 15 until late in August and the first week of September. The late planting, dry and warm weather during the summer delayed tuber set until almost the middle of August. This resulted in almost all the yield being made

the very last part of the growing season. Growth cracking, air checking, hollow heart and skinning were common defects in many named varieties and new selections.

Kennebec and Red Pontiac averaged the highest yields when grown at six locations in North Dakota. Viking and Norland also produced fairly high yields. The lowest yielding variety was Russet Burbank. The low yield of Russet Burbank can be contributed to the late maturity, late set and very low percent US No. 1. Line ND9086-1 produced high yields when grown in the variety trials at Park River and Grand Forks and Carrington. Line ND8888-2, a cross between Cascade and Norchip also produced high yields when tested at only Park River and Grand Forks. Line ND8913-4Russ and ND8914-5Russ produced only medium yields but the tuber type, shape and russetting were very good.

The highest yields were found at Park River and Carrington and the lowest yields were found at Williston located in western North Dakota. The plots at Williston were planted when it was very wet in the spring and then were very dry throughout most of the summer. At Minot yields were fairly good in spite of the fact there was a moisture deficiency and the temperatures were fairly warm during July. The irrigation trial at Carrington averaged 390 cwt per acre and the dry land 270 cwt per acre, which was an increase of 120 cwt for the irrigated trial.

The highest total solids were again found with the variety Norchip. Year after year this variety consistently has the highest total solids of all varieties and selections tested in the trials. Norland and Red Pontiac were the lowest in total solids which is also the usual trend for these two varieties. Bison produced total solids averaging over 19.0 percent which can be considered about medium in comparison to other varieties and selections. Line ND9079-1R, a red skinned selection, produced very high total solids when grown at only Park River and Grand Forks.

Disease

Disease Testing. No new selections were found to be resistant to potato virus X (PVX) or potato spindle tuber virus (PSTV) over that reported in 1973. A total of 2,105 tubers from 902 selections were indexed for PSTV and PVX. Of these, 172 were advanced selections, 27 were out of state, 630 were first year seedlings and 73 were miscellaneous selections. Of the 172 selections, 49 showed at least one of eight tubers with a PSTV infection by the index method; 11 by both the index and Florida methods together, and four by Florida observations alone. Of the 630 first year seedlings, 98 selections were indexed positive for PSTV in at least one of two tubers and were consequently dropped from the program. No first year seedlings whose parents were free of PSTV showed symptoms at harvest. Of 27 out-of-state parents, 13 had one of four tubers indexed positive for PSTV and three with three of four tubers indexed positive for PSTV. This clearly indicates that both the tomato index and Florida tests are necessary in order to eliminate infected tubers. In addition, it may be difficult to decide on the level of infectivity if a limited number of tubers per plant are indexed; this is especially true in first year seedlings as the virus titer is low at that point.

The number of PVX infected selections was very low with only 43 tubers of the 2,105 infected and 12 of these were out-of-state selections. The Florida tests were relied upon for the identification of potato leaf roll virus.

The normal annual evaluations for common scab and silver scurf were not made in 1974 because of heavy rains which compacted the soil and eliminated the plot.

The selections 7196-18 and 6634-2R (Bison) continued to show excellent late blight resistance (race 0).

Selections 8888-1 and -2, 8850-2, 8767-10R and 8750-20 showed moderate resistance to verticillium wilt in the greenhouse, using the toothpick test. Difficulty was encountered in estimating wilt resistance of selections grown in an artificially infested field on the Fargo station.

North Dakota Table 1. 1974 Chip Tests of Varieties and Selections Grown at Grand Forks, North Dakota in 1973.

	January 15			January 29			February 5			February 12		
	Color Chart		Photo	Color Chart		Photo	Color Chart		Photo	Color Chart		Photo
	1/	2/	3/	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield	Yield
Kennebec	8.5	15.0	29.0	29.0	32.4	27.5	5.8	28.5	28.8	6.8	26.3	28.6
Norchip	6.3	30.3	32.8	32.8	40.6	31.4	5.5	33.6	32.4	4.0	39.8	31.1
C-230-14	10.0	8.6	29.7	29.7	14.4	29.5	10.0	10.8	28.9	10.0	14.3	28.8
7103-4	7.5	22.4	32.5	32.5	6.8	33.3	6.0	30.6	31.9	4.5	38.0	32.2
7196-18	6.3	26.3	31.8	31.8	5.4	29.0	5.0	31.5	28.3	4.5	38.3	30.7
7642-2 Russ	8.8	15.3	31.7	31.7	9.0	30.3	9.0	14.5	29.7	9.0	14.3	32.5
7710-5	7.5	21.3	29.8	29.8	6.5	30.1	5.0	28.6	29.9	5.8	30.4	32.4
7878-1	4.8	34.0	30.9	30.9	4.3	31.0	5.5	27.1	29.8	3.9	37.5	32.7
8297-1	6.3	28.3	31.9	31.9	5.0	31.2	5.3	33.1	30.4	4.5	41.0	30.3
6634-2R	4.5	30.0	30.8	30.8	5.0	30.4	4.5	35.0	30.2	4.0	40.0	-
Abanaki	-	19.5	-	-	-	-	-	-	-	-	-	-
8767-10R	-	17.5	-	-	-	-	-	-	-	-	-	-
8200-4R	-	12.5	-	-	-	-	-	-	-	-	-	-

- 1/ Color Chart - (1 - light; 11 - dark).
2/ Photovolt - higher numbers are lighter in color.
3/ Yield - percent chip yield.

North Dakota Table 2. 1974 Chip Tests of Varieties and Selections Grown at Park River During 1973.

	January 15			January 29			February 5			February 12		
	Color Chart		Photo	Color Chart		Photo	Color Chart		Photo	Color Chart		Photo
	1/	2/	Yield 3/	1/	2/	Yield 3/	1/	2/	Yield 3/	1/	2/	Yield 3/
Kennebec	8.0	16.3	31.0	7.5	21.4	29.7	5.0	28.3	31.8	7.0	23.1	31.0
Norchip	8.0	17.0	35.9	6.0	30.8	31.4	4.0	33.6	32.4	4.8	31.1	29.6
C-230-14	11.0	7.9	30.4	10.0	10.4	28.7	10.0	9.0	31.8	10.0	11.0	29.1
7103-4	9.0	14.0	31.9	6.9	25.8	30.6	6.5	27.5	32.5	5.8	28.8	30.6
7196-18	6.3	23.3	32.8	5.0	35.8	28.5	4.5	31.3	32.7	4.5	34.4	30.9
7642-2 Russ	9.5	14.0	30.4	9.0	14.9	28.9	10.0	13.3	29.9	10.0	10.6	29.1
7710-5	9.0	13.3	31.6	7.3	22.5	30.0	6.0	22.4	31.5	6.5	27.6	28.3
7878-1	8.0	17.8	30.2	6.8	23.1	29.9	45.	31.6	31.2	6.8	25.3	30.1
8297-1	8.0	19.75	34.7	7.4	22.0	29.5	6.3	29.1	31.6	6.9	21.8	31.2
6634-2R	-	-	-	7.0	23.5	29.0	9.0	16.0	30.8	6.0	27.0	28.9
(Park River)												
6634-2R	-	-	-	10.0	11.7	-	4.5	29.5	32.5	11.0	11.2	27.5
(Barnesville)												

1/ Color Chart - (1 - light; 11 - dark).

2/ Photovolt - higher numbers are lighter in color.

3/ Yield - percent chip yield.

North Dakota Table 3. 1974 Cooking Tests of Varieties and Selections Grown at Grand Forks in 1973.

BOILING TEST					BAKING TEST				
Varieties	Slough- ing 1/	Mealiness 2/	Texture 3/	Color	Mealiness	Texture	Color	Flavor 6/	
				After Cook- ing.4/					4 hrs. After Cook- ing.5/
Chieftain	8.5	8.3	8.5	8.3	7.3	7.5	8.0	7.5	
Kennebec	8.8	6.8	8.5	8.5	7.0	8.3	8.3	8.0	
Norchip	9.8	9.3	9.0	9.5	8.0	9.0	9.0	8.8	
Norgold	9.8	9.3	9.0	10.0	8.5	9.0	9.3	8.8	
Norland	8.5	8.3	8.3	8.8	8.3	8.0	8.0	8.8	
Red Pontiac	8.5	7.3	8.0	8.8	8.0	7.3	8.0	8.3	
Russ Burbank	8.3	7.3	8.0	7.0	6.3	7.5	7.5	8.0	
Viking	8.8	8.3	8.5	9.8	9.3	8.3	9.3	8.3	
6634-2R	8.0	7.5	8.3	8.8	8.3	7.5	8.3	8.3	
7103-4	8.5	8.5	8.3	9.3	8.5	9.0	8.8	8.8	
7196-18	8.0	8.5	8.0	8.3	7.8	8.8	8.3	8.8	
7642-2 Russet	8.8	8.0	8.0	7.3	7.0	7.3	6.3	7.5	
7710-5	8.5	8.5	8.3	8.8	7.5	8.5	8.3	7.8	
7878-1	9.0	8.8	8.5	9.0	8.0	9.8	8.3	8.5	
8200-4 R	8.5	8.3	8.0	9.3	8.0	7.8	8.0	7.8	
8297-1	8.8	8.0	8.0	8.5	7.8	8.0	7.5	7.5	
8691-10R	8.3	7.8	8.0	8.3	7.0	8.0	7.5	7.5	
8730-13R	8.5	7.5	8.0	8.3	7.0	8.0	7.5	7.0	
8767-10R	8.8	8.3	8.0	9.3	8.0	8.5	8.0	8.0	
8844-7R	7.0	6.3	7.0	6.5	6.3	8.0	7.0	7.3	
W-230-14	9.0	8.5	8.3	9.0	7.8	7.8	7.3	7.0	

- 1/ 1 severe sloughing, 10 no sloughing
2/ 1 not mealy, 10 very dry and mealy.
3/ 1 poor texture, 10 good texture.
4/ 1 dark color, 10 very white color.
5/ 1 dark color, 10 very white color.
6/ 1 poor flavor, 10 good flavor.

BOILING TESTBAKING TEST

Varieties	Slough- ing <u>1/</u>	Meal- iness <u>2/</u>	Tex- ture <u>3/</u>	Color		Meal- iness	Texture	Color	Flavor <u>6/</u>
				Immed. After Cooking <u>4/</u>	Color 4 hrs. After Cook- ing <u>5/</u>				
Chieftain	6.5	5.8	7.3	7.5	6.3	6.8	7.8	8.3	7.3
Kennebec	7.5	7.3	7.3	7.0	6.8	6.8	7.3	7.5	7.3
Norchip	9.3	8.8	8.0	8.0	7.5	8.5	8.0	7.5	8.0
Norgold	8.8	8.5	8.5	8.5	7.3	9.0	8.8	9.0	8.8
Norland	9.0	8.5	8.0	8.5	8.3	8.3	8.3	8.8	8.5
Red Pontiac	7.5	6.8	8.0	8.0	7.3	7.3	7.8	7.8	7.3
Russ Burbank	8.3	6.8	7.8	6.8	6.5	7.0	7.3	6.8	7.0
Viking	9.3	8.5	8.5	9.5	8.8	8.0	8.3	9.3	8.5
6634-2R	8.5	7.8	8.0	8.0	7.3	7.8	7.5	8.0	8.0
7103-4	9.0	8.3	8.0	8.5	7.3	8.5	8.0	8.8	8.0
7196-18	9.0	8.5	8.0	8.3	7.8	8.0	8.0	8.0	8.0
7642-2 Russ	8.3	7.0	7.5	7.0	6.8	7.3	7.3	6.5	7.3
7710-5	8.8	8.5	8.3	8.3	7.8	8.0	8.0	7.8	8.0
7878-1	8.5	8.3	8.3	9.0	9.0	9.0	8.0	7.8	8.0
8200-4R	8.5	7.8	7.8	8.0	8.0	7.3	7.8	7.3	7.8
8297-1	9.3	8.8	8.5	8.5	7.8	8.5	8.3	7.5	8.0
3691-10R	8.3	7.3	7.8	8.3	8.0	7.0	7.0	7.3	7.8
8730-13R	8.0	7.0	7.8	8.3	7.3	6.3	6.8	6.8	7.0
8767-10R	9.0	8.0	8.0	8.5	8.0	7.5	7.3	7.0	7.0
8844-7R	7.8	6.8	7.0	7.0	6.5	6.3	6.5	6.5	6.5
W-230-14	8.8	8.3	7.8	8.5	8.0	7.8	7.5	7.3	7.8

1/ 1 severe sloughing, 10 no sloughing.2/ 1 not mealy, 10 very dry and mealy.3/ 1 poor texture, 10 good texture.4/ 1 dark color, 10 very white color.5/ 1 dark color, 10 very white color.6/ 1 poor flavor, 10 good flavor.

North Dakota Table 5. Marketable Yield and Percent United States No. 1 of Varieties and Selection Grown in State-Wide Potato Trials, 1974.

	<u>Grand Forks</u>		<u>Park River</u>		<u>Carrington</u>		<u>Williston</u>		<u>Minot</u>		Average cwt/A
	cwt/A	% US No. 1	cwt/A	% US No. 1	Dryland cwt/A	% US No. 1	Irrig. cwt/A	% US No. 1	cwt/A	% US No. 1	
Kennebec	191	89	255	89	296	96	537	94	165	89	257
Red Pontiac	223	91	289	91	301	96	472	93	176	93	254
Viking	177	85	235	92	320	97	506	96	156	98	240
Norland	179	90	271	93	320	97	442	94	175	94	239
Norgold Russet	153	74	270	89	304	93	421	94	126	91	224
Norchip	213	88	214	84	272	95	396	94	134	83	217
Chieftain	173	88	195	89	234	93	432	92	146	92	201
ND7710-5	146	85	259	89	238	94	345	93	161	98	195
ND6634-2R	180	82	171	81	251	93	367	92	137	92	194
ND8767-10R	127	72	231	88	235	97	308	95	138	93	160
ND7196-18	127	57	160	71	265	91	338	87	108	78	172
Russet Burbank	54	54	131	65	191	90	268	82	100	75	135 ^{1/}
ND9086-1	243	89	278	88	307	90	439	90			317 ^{1/}
ND8742-2	193	93	212	89	305	97	344	96			264
ND8750-20	129	81	188	88	237	92	359	96			228
ND9109-12R	150	73	171	73	236	92	271	86			207 ^{2/}
ND8888-2	190	82	250	80							220 ^{2/}
ND7878-1	188	88	221	91							205
ND8850-2	198	76	208	75							203
ND9079-1R	184	76	213	82							199
ND8947-2Russ	157	78	230	89							194
ND8913-4Russ	191	88	176	74							184
ND8914-5Russ	169	78	188	81							179
ND8297-1	142	76	150	79							146
Average	170		215		270		390		144		54

1/ Average 4 locations 2/ Average 2 locations

	Carrington												Ave. Sp. Gr.
	Grand Forks		Park River		Dryland		Irrig.		Minot		Williston		
	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	Sp. Gr. Solids	
Norchip	82	20.1	89	21.6	91	22.0	84	20.5	96	23.1	94	22.7	89.3
ND8767-10R	82	20.1	86	20.9	90	21.8	84	20.5	91	22.0	90	21.8	87.2
ND7196-18	77	19.0	88	21.4	88	21.4	81	19.9	86	20.9	85	20.7	84.2
Russet Burbank	72	18.0	77	19.0	90	21.8	87	21.2	95	22.9	83	20.3	84.0
Norgold Russet	77	19.0	81	19.9	84	20.5	73	18.2	92	22.2	87	21.2	82.3
ND7710-5	82	20.1	83	20.3	84	20.5	77	19.0			77	19.0	80.6
Kennebec	69	17.3	74	18.4	85	20.7	78	19.2	88	21.4	84	20.5	79.7
ND6634-2R	76	18.8	77	19.0	81	19.9	73	18.2	82	20.1	87	21.2	79.3
Viking	76	18.8	78	19.2	83	20.3	71	17.7	83	20.3	85	20.7	79.3
Chieftain	72	18.0	76	18.8	84	20.5	76	18.8			85	20.7	78.6
Norland	76	18.8	77	19.0	77	19.0	72	18.0	78	19.2	77	19.0	76.2
Red Pontiac	70	17.5	73	18.2	77	19.0	70	17.5	74	18.4	78	19.2	73.7
ND8742-2	76	18.8	81	19.9	83	20.3	69	17.3					77.3
ND90	74	18.4	78	19.2	80	19.7	71	17.7					75.8
ND8750-20	74	18.4	76	18.8	86	20.9	67	16.9					75.8
ND9109-12R	70	17.5	71	17.7	78	19.2	66	16.7					71.3
ND9079-1R	87	21.2	89	21.6									80.0
ND8850-2	84	20.5	85	20.7									84.5
ND8913-4Russ	80	19.7	84	20.5									82.0
ND8297-1	78	19.2	81	19.9									79.5
ND8914-5Russ	74	18.4	84	20.5									79.0
ND7878-1	77	19.0	81	19.9									79.0
ND8888-2	74	18.4	82	20.1									78.0
ND8947-2Russ	68	17.1	74	18.4									71.0
Average	76.1		80.2		83.8		74.9		86.5		84.3		

1/ 1.0 omitted from specific gravity readings.

2/ Average in 4 locations.

3/ Average in 2 locations.

OHIO

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POTATO VARIETY TRIALS - 1974

The work was done under a cooperative arrangement between the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University, the Ohio Potato Growers Association and local growers. The purpose is to test promising new varieties under various farm practices and conditions.

Eight varieties were planted in three replicates on each of the six Ohio farms. They were also planted on the muck experimental farm at Celeryville. In addition to the main study on the six farms, twelve varieties, including seven of the eight, were tested in a similar manner on a southern Ohio sandy soil for early market; and twenty selections were tested in small duplicated plots on two of the six farms to find the most promising new cultivars. for the main study the following year. This report concerns only the main study on the six farms and the early market farm in southern Ohio. A complete report including all of the work is available. The data in the tables are the averages of the six farms.

Each plot consisted of two rows, in each of which 50 seed pieces were planted. Seed spacing varied from $8\frac{1}{2}$ to 11 inches in the rows and 32 to 36 inches between rows. Each grower followed his usual field practices in planting, fertilization, culture, and spraying. Planting dates varied from April 23 to May 28. The seed was cut shortly before planting in each case and was dusted with polyram.

Fertilizer practices varied somewhat but were generally equivalent to about 1,000 to 1,400 pounds of 10-20-20 per acre with additional nitrogen plowed down on three of the six farms. Farms one and two and the early market farm had sandy loams while the other four farms had various types of silt loam.

Stand, vigor, and disease were evaluated during the growing season. The tubers were weighed when harvested and a fifty pound sample was then collected from each plot for grading. Samples of marketable tubers were then collected for tests on stem end discoloration, specific gravity, chipping quality and storage.

Rainfall was fairly well distributed from June thru August, although in some cases a bit deficient in July, except on Farm No. 2 where drought conditions prevailed. In some cases rains were rather heavy in May and June. Temperatures during the growing season were slightly below normal.

Stands were generally above average except on one farm where heavy rains compacted the soil after planting. The average was 90.5 percent. As usual, Shurchip led in stand.

Very little virus disease was found in the field on the two farms checked weekly, except for leaf roll and mosaic on one farm in Penn 71 and some leaf roll in Superior. A considerable amount of fusarium and/or verticillium wilt was found in Kennebec, Penn 71, Abnaki, Superior, and Hudson. Late blight was severe on one of the two farms checked and was present on some of the other farms.

Superior and Katahdin were included as standards for grade, yield, and other responses; and Kennebec was included as a chip quality standard. Hudson (N Y 41) produced the highest total and marketable yields as it did in 1971, 1972, and 1973, the three other years evaluated. Kennebec and Shurchip were next in marketable yield as in past years although Shurchip usually slightly outyielded Kennebec in the past.

The average marketable yields in Cwt. per acre for the six farms follow: Hudson 395.77, Kennebec 362.38, Shurchip 305.38, Katahdin 300.80, Norchip 296.64, Penn 71 293.24, Superior 266.48, Abnaki 260.38 and average of all 310.09.

Abnaki was planted on only three of the six farms including the farm with lower yields due to drought. It usually yields well. Comparison of Superior and Hudson in yield is unfair since Superior is an early variety and Hudson has about the same maturity as Katahdin.

Specific gravity and chip tests were made at Ohio State University by Dr. Wilbur A. Gould, and are reported separately. The term "marketable yield" used in the tables is essentially synonymous with U.S. No. 1 grade, i.e. A size tubers fairly free of external defects.

AVERAGE YIELD OF MARKETABLE POTATOES BY VARIETY AND BY FARM, IN CWT. PER ACRE - MAIN PLOTS

OHIO POTATO VARIETY TRIALS - 1974 (Listed in order of yield)

<u>FARM NO. 1</u>	<u>FARM NO. 2</u>	<u>FARM NO. 3</u>	<u>FARM NO. 4 (1)</u>	<u>FARM NO. 5 (1)</u>	<u>FARM NO. 6 (1)</u>						
Hudson	446.56	Hudson	341.95	Kennebec	435.46	Hudson	537.68				
Kennebec	377.93	Kennebec	209.89	Katahdin	336.86	Norchip	384.81	Kennebec	485.10		
Abnaki	364.46	Katahdin	196.54	Kennebec	329.24	Penn 71	374.29	Shurchip	329.87	Norchip	418.44
Shurchip	341.09	Superior	182.56	Penn 71	294.21	Shurchip	360.47	Penn 71	329.27	Shurchip	385.44
Norchip	303.69	Norchip	144.95	Abnaki	280.75	Hudson	350.27	Superior	302.57	Penn 71	377.74
Katahdin	299.20	Shurchip	142.39	Shurchip	270.89	Katahdin	349.95	Norchip	281.09	Katahdin	367.40
Superior	283.30	Abnaki	135.90	Norchip	246.84	Superior	243.19	Katahdin	259.93	Superior	331.10
Penn 71	254.69	Penn 71	129.24	Superior	216.17						
Average	334.00		171.25		290.19		355.31		329.85		415.00

(1) No Abnaki

EARLY MARKET TRIALS - MARIETTA - 1974

VARIETY	PERCENT		PERCENT		MARKETABLE	
	Stand	Vines Dead (1)	Size B (2)	Size C (3)	Per Cent	Cwt./Acre
Shurchip	94.7	95	4.2	.4	90.8	417.79
Abnaki	96.7	95	2.6	1.0	93.4	409.15
Kennebec	94	85	5.8	.2	85.8	393.98
Superior	92.3	100	3.2	.2	93.4	385.54
Norchip	90.3	95	7.2	.6	90.4	347.52
Katahdin	90.7	95	6.2	.6	90.2	331.97
Anoka	94.3	100	9.2	.4	88.2	330.62
Seminole	98	100	4.2	.2	91.4	326.40
Wischip	93.3	100	9.4	.2	89.6	282.05
Penn 71	94.7	100	5.4	.6	86.6	261.89
Norland	93.7	100	11.8	.4	87.0	222.72
York (4)	83	100	8.8	.4	88.8	158.21
Average	93	-	6.5	.4	89.6	322.15

- (1) Percent vines dead when shredded on August 7.
 (2) 1 7/8 inch screen
 (3) 1 1/4 inch screen
 (4) Planted two weeks later

SUMMARY OF AVERAGE YIELD AND OTHER DATA IN MAIN PLOTS - OHIO VARIETY TRIALS - 1974

(Listed in approximate order of maturity)

VARIETY	PERCENT STAND	WT. OF 40 TUBERS - LBS.	PERCENT SIZE B	PERCENT CULLS	PERCENT MARKETABLE	WKT. YIELD CWT./A	ORDER OF YIELD
Superior	91	13.8	3.5	4.7	91.9	266.48	7
Penn 71	88	17.7	4.3	7.9	87.8	293.24	6
Abnaki (1)	94	15.4	4.2	4.4	91.3	260.38	8
Norchip	88	12.2	6.7	5.9	87.5	296.64	5
Shurchip	94	12.6	5.2	6.7	88.1	305.04	3
Kennebec	89	18.8	3.0	14.5	82.5	362.38	2
Katahdin	91	19.1	4.9	5.7	89.3	300.80	4
Hudson	90	20.4	1.5	11.6	87.3	395.77	1
Average	90.5	16.2	4.2	7.7	88.2	310.08	

(1) Early market and main farms 1, 2, and 3 only.

PENNSYLVANIA

Clarence S. Bryner

In 1974 Extension variety demonstrations were conducted in cooperation with county extension agents and potato growers in the following counties: Potter, Somerset, Schuylkill, Lehigh and York. Fifteen varieties and two seedlings were evaluated for yield and other characteristics.

<u>County</u>	<u>Grower</u>	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Planting To Harvest Days</u>
Lehigh	Paul Zimmerman & Son	5/2	9/26	147
Potter	Barnett Brothers	5/16	9/24	131
Schuylkill	E. Dresher	4/30	9/6	129
Somerset	R. & T. Croner	5/7	9/18	134
York	W. W. Warner & Sons	4/26	9/27	154

All demonstrations were planted as randomized blocks with three or four replications except for Nooksack with one replication. Seedpieces of each variety were hand spaced in single 25 foot row plots, 9 inches apart within the row except the Potter trial which was machine planted at 10 inches spacing. Rows were 34 inches apart. Contrasting color potatoes were planted in 5 foot breaks between plots to identify the plots at harvest time.

Total yields were recorded at harvest and tubers were graded for sizes 1 3/4 to 2 1/4 inches, and 2 1/4 inches up.

High fertility, excellent soil and air temperatures, and moisture; resulted in record yields of some varieties in Lehigh and York counties. Nampa and Targhee had better shaped potatoes in the Potter and Somerset trials where the amount of applied nitrogen was low. Only nitrogen was applied in the Somerset trial and applied too late for many varieties.

Research is needed with the Nampa and Targhee varieties on sizing as affected by the amount and timing of nitrogen applications on different seed-piece spacings.

Specific Gravity Determinations and Chip Color Rating

Specific gravity was determined by the weight in air-and-water method. Single varietal samples were composited from all replications at each location.

Chip color ratings are an average of three or four fries made during the period 9/10/74 to 11/13/74 on potatoes stored at 58° to 65°F. Ratings are on a scale of 1 to 9 with 1 being white, and 2 to 4 acceptable. Chips rating 5 are borderline. Chipping tests were not made on varieties showing unacceptable color in previous years.

The specific gravity determinations and chip color ratings were made by James Watts, Horticulturist, and Harry Boyer, Technician, Wise Foods Division, Borden, Incorporated, Berwick, Pennsylvania.

Pennsylvania Tables 1 and 2. Stand, tuber yields, size distribution, specific gravity, and chip color ratings of 15 varieties and two seedlings, 1974.

Table 1. Five Trial Averages

Variety	% Stand	Total Cwt/A	Yield		% Size Distribution			Specific Grav. 1.0+	Chip Color
			1	3/4" Up	1	3/4"-2 1/4"	2 1/4" Up		
Line 6RF-1	95	506		449		19	81	704	5.0
Cascade	93	483		449		18	82	717	-
Hudson	94	469		449		13	87	714	-
Kennebec	94	450		430		13	87	721	4.7
Penn 71	95	422		405		12	88	684	3.2
Line 6CX-6	92	404		380		19	81	754	3.9
Katahdin	93	402		379		17	83	682	5.0
Bake King	92	389		366		17	83	808	-
Viking	92	371		357		13	87	678	-
Nampa	91	405		355		34	66	819	6.9
Chieftan	95	378		345		22	78	660	-
Targhee	94	409		338		37	63	768	7.5
Norchip	94	361		323		26	74	734	3.6
Superior	95	334		317		17	83	718	4.3
Monona	92	313		288		22	78	638	2.6
Nooksack	87	271		258		18	82	817	5.2
Norland	94	260		231		33	67	629	-
Average	93	390		360		21	79	720	4.7

1/ Three location average

Table 2. Lehigh County Trial

Variety	% Stand	Total Cwt/A	Yield		% Size Distribution			Specific Grav. 1.0+	Chip Color
			1	3/4" Up	1	3/4"-2 1/4"	2 1/4" Up		
Cascade	97	669		638		10	90	702	-
Hudson	98	616		591		11	89	711	-
6RF-1	99	591		551		13	87	679	5.7
Viking	96	528		515		8	92	667	-
Penn 71	98	496		486		7	93	655	4.0
Kennebec	96	492		475		11	89	676	4.3
6CX-6	98	487		467		11	89	736	5.3
Bake King	99	463		444		12	88	774	-
Norchip	98	474		443		20	80	732	3.7
Katahdin	96	447		424		13	87	676	6.0
Nampa	91	449		406		21	79	744	7.3
Chieftan	97	421		404		12	88	632	-
Monona	92	405		387		13	87	589	3.3
Superior	98	359		346		11	89	658	4.3
Targhee	97	437		342		36	64	758	8.0
Norland	98	337		318		21	79	544	-
Nooksack	91	302		286		12	88	804	5.7
Average	96	469		442		14	86	690	5.2

Previous Crop: Clover

Fertilizer: 12 loads cattle manure applied per acre prior to plowing
800 lbs 16-8-8 per acre in the row

Pennsylvania Tables 3 and 4. Stand, tuber yields, size distribution, specific gravity, and chip color ratings of 15 varieties and two seedlings, 1974.

Table 3. Potter County Trial

Variety	% Stand	Total Cwt/A	Yield		% Size Distribution			Specific Grav. 1.0+	Chip Color
			1	3/4" Up	1	3/4"-2 1/4"	2 1/4" Up		
Kennebec	87	387		364		12	88	814	4.7
Cascade	83	388		356		21	79	692	-
Line 6RF-1	89	354		333		18	82	768	4.7
Targhee	85	387		330		34	66	821	8.0
Penn 71	90	348		329		11	89	769	3.0
Nampa	83	370		322		29	71	929	7.3
Hudson	84	333		321		10	90	768	-
Bake King	81	336		313		25	75	897	-
Chieftan	88	354		305		30	70	728	-
Katahdin	88	316		295		18	82	735	5.0
Superior	90	298		275		25	75	789	5.0
Line 6CX-6	84	303		274		24	76	811	4.3
Viking	84	280		263		15	85	737	-
Monona	87	268		236		24	76	700	2.3
Norchip	89	269		207		40	60	768	4.0
Nooksack	85	140		134		28	72	882	5.7
Norland	87	155		131		40	60	706	-
Average	86	311		282		24	76	783	4.9

Previous Crop: Clover

Fertilizer: Row 1400 lbs 5-10-10 per acre

Table 4. Schuylkill County Trial

Variety	% Stand	Total Cwt/A	Yield		% Size Distribution			Specific Grav. 1.0+	Chip Color
			1	3/4" Up	1	3/4"-2 1/4"	2 1/4" Up		
Hudson	99	326		309		14	86	648	-
Line 6RF-1	98	332		281		34	66	689	2.5
Kennebec	98	281		263		16	84	665	2.3
Cascade	100	276		240		24	76	710	-
Viking	96	250		237		18	82	630	-
Norchip	96	261		234		25	75	732	1.8
Penn 71	97	247		233		16	84	643	1.8
Superior	98	242		226		19	81	743	1.5
Katahdin	96	243		222		19	81	710	2.5
Line 6CX-6	94	246		220		29	71	745	1.5
Chieftan	99	238		219		20	80	603	-
Bake King	96	241		217		20	80	774	-
Targhee	100	280		196		47	53	746	5.0
Monona	97	217		192		26	74	656	1.8
Norland	98	206		172		41	59	603	-
Nooksack	85	178		161		22	78	754	2.5
Nampa	98	214		156		55	45	764	5.0
Average	97	252		222		26	74	695	2.6

Previous Crop: Wheat stubble and timothy

Fertilizer: Broadcast before plowing 700 lbs 10-5-5

Row - 1500 pounds 10-5-5

Pennsylvania Tables 5 and 6. Stand, tuber yields, size distribution, specific gravity, and chip color ratings of 15 varieties and two seedlings, 1974.

Table 5. Somerset County Trial

Variety	Total Cwt/A	Yield			% Size Distribution			Specific Grav. 1.0+	Chip Color
		1	3/4"	Up	1	3/4"-2	1/4" 2 1/4" Up		
Line 6RF-1	502		466		21		79	769	6.0
Kennebec	445		421		16		84	771	5.3
Penn 71	441		411		19		81	721	2.7
Line 6CX-6	423		392		22		78	788	3.3
Katahdin	425		387		29		71	678	5.0
Cascade	419		376		24		76	752	-
Bake King	388		363		20		80	805	7.7
Hudson	390		353		24		76	710	-
Targhee	418		343		49		51	812	8.0
Nampa	411		338		48		52	825	7.0
Viking	344		328		17		83	710	-
Nooksack	324		306		20		80	828	5.7
Chieftan	352		301		37		63	675	-
Superior	304		279		28		72	722	5.0
Norchip	293		259		34		66	747	3.3
Monona	272		240		37		63	699	1.7
ND 7878-1	274		229		38		62	644	4.7
Norland	238		196		52		48	699	-
Average	370		333		30		70	742	5.0

Stand essentially 100% for all varieties.

Previous Crop: Potatoes

Fertilizer: 100 lbs nitrogen applied in irrigation water August 1.

Table 6. York County Trial

Variety	Total Cwt/A	Yield			% Size Distribution			Specific Grav. 1.0+	Chip Color
		1	3/4"	Up	1	3/4"-2	1/4" 2 1/4" Up		
Line 6RF-1	752		719		10		90	613	6.3
Hudson	683		671		4		96	732	-
Cascade	663		636		9		91	728	-
Kennebec	645		624		8		92	679	6.7
Katahdin	580		567		6		94	613	6.3
Penn 71	578		563		6		94	633	4.3
Nampa	579		551		16		84	833	7.7
Line 6CX-6	561		546		9		91	691	5.3
Chieftan	520		497		9		91	661	-
Bake King	519		494		8		92	790	-
Targhee	524		478		21		79	703	8.3
Norchip	506		475		13		87	689	5.3
Superior	470		461		4		96	678	5.7
Viking	453		444		5		95	644	-
Nooksack	411		404		6		94	815	6.3
Monona	404		384		10		90	544	3.7
Norland	367		337		12		88	591	-
Average	542		521		9		91	685	6.0

Previous Crop: Corn Stand: 90 to 98 percent

Fertilizer: 10 loads cattle manure applied prior to plowing.
1,300 lbs 10-10-10 in row.

PENNSYLVANIA

J. D. Harrington

Potato variety trials were conducted at the Agronomy Research Farm near Rock Springs in central (Centre County) Pennsylvania in 1974.

Soil at the experimental site was deep, heavy, and well-drained. Soil organic matter content was 2.0 percent and soil pH 5.5. Prior to varietal hand-planting, rows were furrowed-out three feet apart and simultaneously treated with systemic insecticide and commercial fertilizer. Varieties received 140-200-300 lb/A N, P_2O_5 , and K_2O , respectively. Normal cultural practices were conducted throughout the growing season.

Seed for 17 varieties and seedling numbers was Maine grown and obtained from either the United States Department of Agriculture or the Maine Department of Agriculture. Seed of 6CX6, 6RF1, and Viking was obtained in Pennsylvania; whereas, seed of Ak. 11-68-4-71 and Snowchip was obtained from Alaska. Seed-pieces (four-cut) were planted nine inches apart within 25 foot single-row plots, with a three-foot break between plots. A randomized block design with four replications for each maturity group was employed. Planting was done on April 24. Soil moisture was not limiting. Irrigation water, when warranted, was supplied throughout the growing season.

Varieties were mechanically harvested with a "Braco" single-row harvester and bagger attachment on October 3, 162 days after planting.

Production and Quality Indices

Varietal maturity, tuber production, and tuber quality indices were obtained as follows:

Maturity: final maturity grouping (early, medium, late) was determined by percent of vegetative tops naturally dead at several observation dates in September.

Total yeild, cwt/A: tubers 1-1/2 inches and larger in diameter were harvested from plots and weighed, and total plot weights were converted to hundredweight yields per acre.

Size A yield, cwt/A, and percent: harvested tubers from each plot were sized and tubers 1-7/8 inches (minimum) and larger in diameter were converted to hundredweight yields per acre. Size A, also, includes at least 40 percent of the potatoes 2-1/2 inches or larger in diameter.

Size B yield, cwt/A: harvested tubers from each plot were sized and tubers from 1-1/2 to 2-1/4 inches (maximum) in diameter were converted to hundredweight yields per acre.

Bakers, cwt/A: harvested tubers from each plot were sized and tubers 3 inches and larger in diameter were converted to hundredweight yields per acre.

Specific gravity: determined from approximately six-pound tuber samples by the air-and-water method.

Percent total solids: values obtained directly from specific gravity readings by employing the conversion table reported by G.V.C. Houghland.

Chip yield, lb/100 lb: an estimate of the pounds of chips obtained from 100 pounds of raw peeled potatoes. Eight-ounce raw samples, peeled and washed and sliced 1/16-inch thick were fried to obtain chip yield.

Chip color, Rd: determined with the Gardner Color Difference Meter. Instrument was standardized against color standard C-LY-1047-57. Rd (reflectance) values 20.0 and above may be considered acceptable for marketing.

All tuber-quality indices were determined on potatoes 2-1/2 inches in diameter size and within 57 days after harvest at the Agronomy Research Farm or the Department of Horticulture's Food Processing Laboratory. After harvest, tubers were stored in a dry barn for seven days and until grading without facilities for control of temperature or humidity. Graded tuber samples for chip indices were stored at room conditions for 50 days before chipping. Duplicate chip yield and chip color determinations were made on composite tuber samples taken at random from four replications.

Results

Summarized highlights of the research results were as follows:

The 18 late-maturing varieties averaged highest in total yields per acre, 361 cwt, whereas the three medium- and one early-maturing (Superior) varieties averaged 318 and 295 cwt, respectively. Late maturing varieties averaged tubers highest in specific gravity, 1.081, and chip color, 17.3 Rd 57 days after harvest. Tuber specific gravity of medium- and early-maturing varieties was 1.071 and 1.076, whereas chip color was 19.4- and 13.8- Rd, respectively.

Highest total yields per acre of medium-, and late-maturing varieties were obtained for Chieftain (330 cwt), and 6RF1 (502 cwt). Lowest yields per acre were produced by Norchip (303 cwt), and Bake King (192 cwt).

Changes in varietal ranking for total yields compared with Size A yields per acre were minor. Varieties which produced the highest and lowest total yields per acre also produced the highest and lowest Size A yields. All varieties produced at least 40 percent of their total yields 2-1/2 inches or larger in diameter (minimum for Size A potatoes). However, some varieties produced a higher or lower percentage of their tubers 2-1/2 inches or larger in diameter.

Highest Size A yields per acre of medium-, and late-maturing varieties were obtained for Chieftain (316 cwt), and 6RF1 (482 cwt). Lowest Size A yields per acre were produced by Norchip (288 cwt), and Bake King (180 cwt).

Varieties with the highest percentage of the total yield 2-1/2 inches or larger in size for the medium- and late-maturity groups were Viking (87%), and Hudson (93%). Round varieties producing the lowest total yield 2-1/2 inches or larger in size were Norchip (76%), and Raritan (66%).

Lowest Size B yields per acre of medium-, and late-maturing round varieties were obtained for Viking (41 cwt) and Hudson (30 cwt). Highest Size B yields per acre were produced by Chieftain (72 cwt), and Raritan (100 cwt).

Highest Bakers yields per acre of medium-, and late-maturing round varieties were obtained for Viking (138 cwt), and Hudson (276 cwt). Lowest Bakers yields per acre were produced by Norchip (86 cwt), and Bake King (40 cwt).

Varieties showing the higher specific gravities produced the higher yields of chips. Varieties of lower specific gravity produced fewer pounds of chips per 100 pounds of potatoes.

Highest specific gravity tubers for the medium- and late-maturity groups were as follows: Norchip, 1.081; and Nampa 1.094. Lowest specific gravity varieties were Chieftain, 1.063; and Hudson, 1.073.

Six of the 22 varieties produced chips sufficiently light in color (20.0 Rd and higher) after harvest to be considered commercially acceptable.

Lines B6987-56, B6987-43, B6987-18, B6987-2, and Nooksack, which were five of the eight lowest yielding late maturing varieties or seedling numbers, produced chips of acceptable color.

Varieties which produced chips lightest in color were B6987-56 (late), and Norchip (medium). Varieties which produced the darkest-colored chips for each of the three maturity groups were Superior, Viking and Nampa.

Pennsylvania Table 1. Production and tuber quality indices of potato varieties grown in central Pennsylvania, 1974.

VARIETY or SEEDLING	-----PRODUCTION INDICES-----				-----QUALITY & CHIP INDICES-----				
	Total yield, cwt/A	Size A yield, cwt/A	%	Size B yield, cwt/A	Bakers yield, cwt/A	Spec. grav.	Total solids, %	Chip yield, lb/100 lb	Chip color, Rd
<u>EARLY MATURITY</u>									
Superior	295	282	81	56	74	1.076	20.4	33.0	13.8
<u>MEDIUM MATURITY</u>									
Chieftain	330	316	78	72	116	1.063	17.9	29.1	17.0
Viking	323	313	87	41	138	1.069	19.0	29.8	15.5
Norchip	303	288	76	70	86	1.081	21.4	33.6	25.9
L.S.D. (.05)	NS	NS	NS	25	NS	0.004	0.6	1.0	NS
C.V., %	14.9	16.0	9.1	23.5	37.4	0.2	1.8	0.7	16.2
<u>LATE MATURITY</u>									
6RF1	502	482	81	93	140	1.077	20.5	30.8	17.9
Nampa	452	424	76	108	91	1.094	23.6	36.2	11.4
Ak. 11-68-4-71	450	425	80	92	121	1.084	21.9	35.0	14.9
Snowchip	440	415	79	93	139	1.076	20.4	33.0	14.8
6CX6	431	416	87	55	211	1.085	22.0	31.8	17.6
Hudson	417	409	93	30	276	1.073	19.8	32.0	13.0
Kennebec	400	380	80	77	138	1.076	20.4	32.0	17.6
Cascade	360	337	76	84	128	1.076	20.2	30.5	11.9
Targhee	344	312	66	115	39	1.084	22.0	35.0	11.6
Katahdin	342	329	82	62	114	1.074	20.0	32.0	17.9
B6987-56	336	321	76	75	113	1.089	22.7	36.4	30.3
Penn 71	327	317	84	51	107	1.074	19.9	33.4	18.5

Pennsylvania Table 1. (Continued)

VARIETY or SEEDLING	-----PRODUCTION INDICES-----				-----QUALITY & CHIP INDICES ^{1/} -----				
	Total yield, cwt/A	Size A yield, cwt/A	% yield,	Size B yield, cwt/A	Bakers yield, cwt/A	Spec. grav.	Total solids, %	Chip yield, lb/100 lb	Chip color, Rd
<u>LATE MATURITY (Cont'd.)</u>									
B6987-2	322	311	85	48	106	1.076	20.4	31.3	21.5
Nooksack	316	309	90	31	147	1.090	22.8	33.9	20.6
B6987-18	316	304	81	58	100	1.075	20.2	31.8	22.2
Raritan	301	273	66	100	47	1.093	23.6	35.7	13.6
B6987-43	253	244	88	31	111	1.079	21.0	31.2	24.4
Bake King	192	180	75	49	40	1.083	21.6	32.2	11.7
L.S.D. (.05)	73	73	7	19	59	0.005	0.9	NS	4.9
C.V., %	14.1	15.0	6.5	19.1	34.7	0.3	2.8	4.7	13.4

^{1/} Specific gravity determined 11/14, 42 days after harvest; chipped 11/29, 57 days after harvest

SOUTH CAROLINA

Irish Potato Variety Trial (Spring 1974)

Clemson University Truck Experiment Station
Charleston, S. C.

W. R. Sitterly

Purpose: To obtain Irish potato varieties suitable for commercial production in coastal South Carolina.

Procedure: A field of fine sandy loam (F-9) was fertilized with 800 lbs/A of granular 10-10-10 fertilizer on Feb. 12. On Feb. 21 potato seed pieces were dropped, the area was broadcast sprayed with 1.5 lbs/A of Eptam, and bedded. On March 21 the area was dragged and re-bedded. The test was harvested on June 3.

A. Replicated yield test

Results: As shown in Table 1, the highest yield was produced by B6969-9, the lowest was by Irish Cobbler, with the others closely bunched.

All entries were closely bunched in regard to specific gravity with the exception of the low value produced by B6969-9.

Cascade was most resistant to ozone damage, followed closely by B6516-5 and B6532-4.

Table 1. Horticultural characteristics of entries in the Irish potato replicated yield trial. Spring 1974.

Entry	: Yield : (cwt/A)	: Specific : gravity	: Maturity :	: Tuber : shape	: Tuber : size	: Ozone ^{1/}
B6516-5	165	1.084	M	Elongate	Large	0.5
B6532-4	168	1.088	M	Oval	Med-large	1.0
B6969-9	201	1.072	M	Oval-elongate	Large	2.0
Cascade	177	1.082	M	Oval-elongate	Med-large	0.0
LaChipper	153	1.085	ME	Oval	Med.	3.5
Irish Cobbler	123	1.087	M	Oval	Med.	2.0

^{1/} Rating = 0.0 (none) - 5.0 (100% defoliated)

Conclusion: The most satisfactory performance in the Irish potato replicated yield trial was produced by Cascade.

B. Observational test

Results: As shown in Table 2, the highest yield was produced by B7629-1, followed fairly closely by B7649-5.

The highest specific gravity was produced by B7619-15 and B7654-12, with the lowest by B7744-4.

The earlier maturing item in this test was B7644-1. B7649-5 had the best tolerance to ozone, followed closely by B7629-1 and B7619-15.

Table 2. Horticultural characteristics of entries in the Irish potato observational test. Spring 1974.

Entry	Yield (cwt/A)	Specific gravity	Maturity	Tuber shape	Tuber size	Ozone ^{1/}
B7573-3	120	1.084	ML	Elongate	Med.	3.0
B7602-1	90	1.085	M	Oval-elongate	Small med.	3.0
B7619-15	138	1.089	ME	Oval-elongate	Small	1.5
B7629-1	225	1.071	M	Oval	Large	1.0
B7649-5	198	1.076	ME	Oval	Med-large	0.5
B7654-12	178	1.089	ML	Elongate	Med.	3.5
B7694-1	165	1.085	E	Elongate	Large	2.0
B7744-4	159	1.064	M	Oval	Large	4.0
B7767-2	147	1.080	ML	Elongate	Large	2.7

^{1/} Rating = 0.0 (none) - 5.0 (100% defoliated)

Conclusion: The best performance in the Irish potato observational trial was produced by B7629-1 and B7649-5.

TEXAS

J. Creighton Miller, Jr.

Variety Development and Testing

Seedling Program. Approximately 10,000 first year seedlings, representing 83 families, were grown near Lubbock in 1974. Seedlings were provided by Dr. Robert H. Johansen of North Dakota State University, and were primarily from families containing russet types. One hundred sixty clones were selected for further study and testing. As in 1973, one half of the tubers from each selected clone was sent to North Dakota for virus indexing, observation, and seed increase. The other half will be grown and evaluated in Texas next year, as second year selections. The 1973 selections were grown in Texas and North Dakota as second year selections in 1974. In 1975, the surviving 40 will be grown as third year selections, in Texas and North Dakota from North Dakota produced seed. A crossing program was initiated in Texas in 1974.

Adaptation Trials. Approximately 225 entries were grown in replicated and non-replicated trials at three locations in West Texas; however, not all entries were included at each locale. Seed was obtained from breeding programs in North Dakota, Idaho, Beltsville (grown in Maine), Colorado, Washington, Louisiana (grown in Wisconsin), and Nebraska. Only the results of the replicated advanced selections and variety trials at Hereford and Lubbock are reported herein.

A number of North Dakota advanced selections were tested at Hereford and Lubbock (Tables 1 and 2). Promising russets at one or both locations included ND-9157-10 Russ, ND-8947-2 Russ, ND-9159-2 Russ and ND-9130-1 Russ. The first two were high yielding, but either produced many small tubers or showed less than average tuber type. The latter two exhibited good tuber type but were moderately high yielding. Among the reds, ND-9386-3 R was high yielding but lacked tuber type. The selection ND-9403-20 R is early maturing, high yielding, and exhibits good tuber type.

In the variety and advanced selection trials at Hereford and Lubbock (Tables 3 and 4) the standard varieties presently grown in the area were the outstanding entries, with the exception of Norgold Russet at Lubbock. Several of the Beltsville russet advanced selections out yielded Norgold Russet at Lubbock. With the exception of B7613-5, these selections were not outstanding with regard to tuber type. The Beltsville material was not included at Hereford. The performance of Norgold Russet at Hereford in 1974 was perhaps the best since its introduction into the area. Vine growth for this variety was considerably above average. Only trace precipitation fell on this crop during the growing season. Among the red varieties, Red LaSoda, Viking and La Rouge were the outstanding entries. The North Dakota advanced selection ND-9109-8 R was outstanding at Hereford. Among the chipping entries, Norchip, ND-7196-18 and FL 460, were outstanding at Hereford. Yield and specific gravity were considerably lower at Lubbock than at Hereford, which is consistent with results obtained in years past.

Strain 10 LaSoda from Nebraska was earlier but less vigorous than the Red LaSoda grown from North Dakota seed. Norgold Russet "M" from Nebraska was more vigorous but later in maturity than the Norgold Russet grown from North Dakota seed.

Texas Table 1. Yield, specific gravity, percent stand, vigor, maturity, average weight per tuber, tuber type and general tuber rating for 14 North Dakota advanced selections and three check varieties grown near Hereford, Texas -- 1974.

Selection or check variety	Yield cwt/A	Specific gravity	Days to emergence	Percent stand	Vigor 1/	Average		Tuber type	General 3/ tuber rating
						Maturity 2/	wt./tuber in oz.		
Viking	400.8	1.061	26	100	3.00	3.25	8.5	Oblong	4.50
ND 9386-3 R	350.2	1.057	26	100	3.50	3.00	4.2	Oblong	2.00
Red LaSoda Strain #10	313.6	1.052	26	80	3.00	3.25	5.1	Oblong	3.00
ND 9159-2 Russ	280.5	1.064	25	100	3.00	3.75	4.0	Oblong	3.50
ND 9157-10 Russ	268.3	1.066	26	100	3.25	3.00	2.1	Long	2.00
ND 9403-9 R	268.3	1.074	25	100	3.00	2.00	4.2	Oblong	2.75
Norgold Russet	264.9	1.057	23	90	3.00	4.00	3.7	Oblong	2.75
ND 9358-3 Russ	252.7	1.059	27	90	3.00	3.75	4.7	Long	2.00
ND 9403-20 R	245.7	1.061	26	90	3.00	4.00	4.3	Oblong	3.00
ND 8947-2 Russ	243.9	1.059	25	100	3.75	3.50	4.7	Long	2.00
ND 9130-1 Russ	243.9	1.066	26	100	3.00	3.50	5.9	Oblong	3.50
ND 9180-4 R	221.3	1.064	29	90	2.50	3.00	6.3	Oblong	3.00
ND 8297-1	216.1	1.063	27	80	3.00	3.25	4.1	Oblong	3.50
ND 9154-2 Russ	212.6	1.064	24	100	2.75	3.00	2.6	Long	1.00
ND 9112-2 Russ	212.6	1.060	27	100	2.75	3.00	3.9	Oblong	3.50
ND 9403-21 R	193.4	1.071	25	100	2.00	4.50	5.7	Oblong	4.00
ND 9193-2 Russ	186.4	1.063	28	90	2.75	4.00	4.2	Oblong	2.75
ND 7710-5	179.5	1.066	30	80	2.50	3.75	5.1	Oblong	4.00
ND 7878-1	167.3	1.063	27	70	2.75	4.00	5.1	Oblong	3.00
ND 9061-1 R	132.4	1.063	25	90	2.00	3.50	3.7	Oblong	2.00
ND 8917-5 Russ	48.8	1.058	28	70	2.00	5.00	3.0	Oblong	2.00
Average	233.5	1.0624	26	91	2.83	3.53	4.5		2.85

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, and 5 = very vigorous.

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, and 5 = very early.

3/ 1 = poor type to 5 = excellent type.

Texas Table 2. Yield, specific gravity, days to emergence, percent stand, vigor, maturity, average weight per tuber, tuber type and general tuber rating for 18 North Dakota advanced selections and three check varieties grown near Lubbock, Texas -- 1974.

Selection or check variety	Yield cwt/A	Specific gravity	Percent stand	Vigor ^{1/}	Maturity ^{2/}	Average wt./tuber in oz.	Tuber type	General ^{3/} tuber rating
ND 9157-10 Russ	594.2	1.078	100	4.25	2.50	4.9	Long	3.60
ND 9386-3 R	519.2	1.070	95	3.50	3.75	7.8	Oblong	2.75
ND 8947-2 Russ	510.5	1.076	100	3.50	3.00	7.2	Long	3.25
ND 9403-20 R	484.4	1.078	100	4.00	4.00	6.7	Oblong	3.50
Norgold Russet	479.2	1.072	95	3.50	4.00	8.5	Oblong	4.25
Viking	477.4	1.073	100	3.00	3.50	8.1	Oblong	4.50
Red LaSoda Strain #10	440.8	1.072	100	3.25	3.75	6.4	Oblong	3.25
ND 9403-9 R	407.7	1.072	100	3.00	2.50	6.2	Oblong	3.00
ND 9403-21 R	385.1	1.078	100	3.00	3.75	7.9	Oblong	3.75
ND 9159-2 Russ	369.4	1.075	90	2.50	3.00	8.4	Oblong	4.25
ND 8297-1	348.5	1.071	100	2.50	3.50	4.4	Oblong	2.50
ND 9130-1 Russ	332.8	1.082	100	3.00	3.25	7.9	Oblong	3.75
ND 9358-3 Russ	322.3	1.079	100	1.75	3.75	7.8	Long	3.00
ND 9112-2 Russ	228.3	1.069	100	2.25	4.50	4.1	Oblong	2.38
ND 7710-5	186.4	-	100	1.75	4.00	4.3	Round	2.50
ND 9154-2 Russ	116.7	-	100	1.75	4.00	3.9	Long	1.00
ND 9193-2 Russ	109.8	-	100	2.50	3.00	5.7	Oblong	2.25
Average	371.3	1.0746	98.8	2.88	3.52	6.5		3.15

$\frac{1}{1}$ = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, and 5 = very vigorous.

$\frac{2}{1}$ = very late, 2 = late, 3 = medium, 4 = early, and 5 = very early.

$\frac{3}{1}$ = poor type to 5 = excellent type.

Texas Table 3. Total yield, percent tubers by weight in 8 ounce grade, average tuber weight in 8 ounce grade, specific gravity, vigor, maturity, chip color nonreconditioned, and chip color reconditioned of 36 potato varieties or selections grown near Hereford, Texas -- 1974.

Variety or selection	Total yield cwt/A	8 oz grade		Specific gravity	Vigor 1/ Maturity 2/ nonrecon.	Chip 3/ color nonrecon.	Chip 4/ color recon.
		% tubers by wt.	Mean tuber wt.				
Red LaSoda	581.5	84.1	13.0	1.065	4.3	3.5	5
Norgold Russet	541.9	82.5	13.7	1.076	3.8	4.0	4
Norgold "M"	535.4	78.3	11.3	1.073	4.3	3.0	4
Red LaSoda Strain 10	514.0	85.0	12.9	1.067	3.8	3.8	5
ND 9109-8R	489.2	83.7	10.5	1.065	3.1	3.8	8
La Rouge	465.0	77.5	12.5	1.066	3.5	4.0	4
Viking	460.2	87.7	14.6	1.075	3.0	3.4	7
Norchip	443.7	81.3	9.3	1.080	4.0	3.0	2
ND 7196-18	434.7	55.7	8.4	1.076	3.5	3.5	2
FL 460	423.6	79.0	9.6	1.074	3.5	3.0	2
Hi Plains	415.6	75.7	11.4	1.073	3.6	3.3	6
NDA 8676-1	409.3	73.6	11.3	1.074	4.0	3.0	5
Neb 93.55-16	392.9	76.8	8.2	1.076	3.0	3.5	2
Monona	387.7	89.8	12.1	1.070	2.4	3.4	2
ND 8200-4R	380.7	82.2	10.9	1.073	2.9	4.8	4
Wischip	370.7	74.1	8.9	1.074	3.0	4.0	2
Kennebec	369.8	73.9	12.2	1.074	4.5	2.5	2
La 71-110	338.9	78.3	9.9	1.064	4.0	3.3	5
Nampa	333.5	62.7	9.8	1.081	5.0	2.0	5
La 91-237	332.2	73.1	9.1	1.072	4.4	3.5	4
Russet Burbank	323.4	57.7	9.4	1.072	4.0	1.5	4
Targhee	313.4	68.0	8.9	1.074	4.8	2.0	7
A 6371-2	311.7	53.9	8.8	1.079	5.0	1.0	5
FL-162	299.0	81.0	12.4	1.069	2.0	4.0	3
NDA 8139-2	299.0	25.0	6.9	1.070	4.5	1.0	3

Continued

Texas Table 3. Continued

or selection	yield cwt/A	% tubers by wt.	Mean tuber wt.	Specific gravity	Vigor ^{1/}	Maturity ^{2/}	color ^{3/} nonrecon.	color ^{4/} recon.
A 69424-1	296.0	60.2	7.8	1.085	5.0	1.5	5	2
Bison	289.0	80.8	10.0	1.076	2.5	3.8	6	3
Neb 52.57-1	248.1	62.5	7.7	1.073	3.5	3.5	6	3
ND 6993-13	225.6	84.8	12.0	1.078	2.5	4.3	7	4
Nooksack	217.8	68.8	9.1	1.083	3.5	1.5	6	3
WC 314-2	215.6	54.7	8.3	1.084	3.0	3.5	7	3
ND 8767-10R	207.1	76.2	9.7	1.084	2.4	4.6	5	3
A 69765-4	205.6	48.5	7.6	1.078	4.3	1.3	5	5
WC 230-14	203.0	65.2	9.8	1.069	3.1	2.0	6	6
WC 285-146	191.9	53.9	8.3	1.079	2.5	4.3	9	6
WC 285-83	153.6	52.6	8.9	1.081	3.5	2.0	5	3
Average	350.6	70.8	10.1	1.075	3.6	3.1	6.2	4.0
C.V.	8.0	8.7	10.9					
L.S.D. (.05)	39.4	8.6	1.6					
(.01)	52.4	11.5	2.1					

^{1/} 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous.

^{2/} 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early.

^{3/} Chipped directly out of storage (4 months, 40° F); 1 = light to 10 = dark brown; PCI Color Scale.

^{4/} Chipped following reconditioning (2 weeks, 70° F); 1 = light to 10 = dark brown; PCI Color Scale.

Texas Table 4. Total yield, percent tubers by weight in 8 ounce grade, average tuber weight in 8 ounce grade, specific gravity, vigor, maturity, chip color nonreconditioned, and chip color reconditioned of 42 potato varieties or selections grown near Lubbock, Texas -- 1974.

Variety or selection	Total yield cwt/A	8 oz grade		Specific gravity	Vigor ^{1/}	Maturity ^{2/}	Chip	
		% tubers by wt.	Mean tuber wt.				color ^{3/} nonrecon.	color ^{4/} recon.
Red LaSoda Strain 10	392.3	78.5	9.2	1.061	3.3	3.4	5	5
Red LaSoda	388.3	75.0	11.2	1.061	4.3	2.9	6	5
Viking	339.8	93.0	14.5	1.066	3.5	3.6	5	4
La Rouge	338.9	69.2	9.1	1.064	3.5	4.0	5	4
FL 460	334.1	60.9	7.9	1.074	3.4	3.1	4	3
Neb 93.55-16	332.4	55.1	9.0	1.073	3.5	3.0	4	3
B 7583-6	331.3	79.3	9.0	1.076	4.0	3.0	5	3
B 7196-20	323.2	87.4	10.3	1.075	3.5	3.0	4	3
FL 162	321.9	75.9	10.7	1.058	3.0	3.5	3	3
Hi Plains	317.6	59.1	9.0	1.072	3.5	3.3	5	4
B 7676-2	317.6	66.5	8.4	1.072	2.5	4.6	5	3
Norchip	316.5	59.9	7.4	1.078	3.5	3.3	3	2
Monona	313.6	85.5	9.0	1.065	2.5	3.3	3	3
B 7813-5	293.6	62.0	9.0	1.077	4.0	4.0	5	5
ND 8200-4R	288.8	71.3	9.6	1.063	2.1	4.3	6	2
NDA 8676-1	288.2	61.6	9.1	1.074	4.0	3.5	7	5
Norgold Russet	285.5	67.7	9.1	1.060	3.1	4.4	6	6
ND 8767-10R	282.5	68.1	9.4	1.073	2.6	5.0	4	2
ND 7196-18	282.3	47.9	7.6	1.065	3.5	3.8	5	2
ND 9109-8R	278.4	65.5	7.4	1.058	2.9	3.9	7	6
La 71-110	272.9	57.9	8.1	1.060	4.0	3.4	7	5
A 69424-1	272.7	52.1	6.7	1.081	4.5	2.0	4	4
Kennebec	259.8	62.5	8.4	1.064	4.4	3.0	4	3
La 91-237	257.2	72.7	9.3	1.062	4.0	3.9	6	4
B 7575-1	250.9	82.2	10.2	1.071	3.0	4.0	5	5
A 6371-2	250.5	31.6	8.0	1.069	4.5	2.0	5	5
Norgold "M"	243.1	40.1	7.2	1.058	4.0	2.5	6	5

Continued

Texas Table 4. Continued

Variety or selection	Total Yield cwt/A	8 oz grade		Specific gravity	Vigor	Maturity	Chip	
		% tubers by wt.	Mean tuber wt.				color nonrecon.	color recon.
Wischip	241.8	57.7	7.4	1.069	3.8	4.0	3	3
A 69765-4	234.1	57.6	7.6	1.080	4.5	2.0	5	4
Russet Burbank	227.0	27.6	7.1	1.058	4.0	1.5	5	5
Targhee	216.7	28.2	7.9	1.063	4.0	2.0	6	6
WC 314-2	210.6	72.1	7.4	1.074	3.8	3.0	6	4
Nampa	207.1	35.6	8.1	1.070	4.3	3.0	7	4
NDA 8139-2	205.4	0	0	1.068	4.0	2.0	5	4
Bison	199.7	70.4	7.1	1.065	2.8	3.9	6	3
B 7147-15	172.3	72.8	8.8	1.073	4.5	1.0	6	3
WC 285-146	171.2	35.7	8.7	1.071	3.0	3.1	8	8
ND 6993-13	157.3	59.0	7.5	1.055	2.5	5.0	9	7
WC 230-14	157.0	39.6	8.8	1.056	3.5	1.0	5	5
Nooksack	145.7	47.4	7.2	1.068	3.5	1.5	7	4
WC 285-83	138.5	48.7	8.1	1.067	3.8	1.9	6	4
Neb 52.57-1	100.6	32.5	6.4	1.070	3.0	4.5	7	5
Average	260.9	58.9	8.4	1.068	3.6	3.2	5.4	4.1
C.V.	11.0		14.2					
L.S.D. (.05)	40.3		1.7					
(.01)	53.0		2.2					

1/ 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous.

2/ 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early.

3/ Chipped directly out of storage (4 months, 40° F); 1 = light to 10 = dark brown; PCI Color Scale.

4/ Chipped following reconditioning (2 weeks, 70° F); 1 = light to 10 = dark brown; PCI Color Scale.

VERMONT

By S. C. Wiggans, W. R. Kelly, R. N. Jensen, H. J. Murphy

During 1974, three potato variety trials were conducted in Vermont by the Plant Pest Control Division of the Vermont Department of Agriculture, the Plant and Soil Science Department of the University of Vermont, and the Plant and Soil Sciences Department of the University of Maine. These trials were located at Rutland, Wolcott, and South Burlington, Vermont. There were five replicates in a randomized block at each location. Seed pieces of all varieties were planted by hand. Seed pieces of Russet Burbank were spaced 18 inches apart, Targhee 12 inches apart and all other varieties 9 inches apart. These plantings were part of the tri-state cooperative variety trial of the National Potato Breeding Program.

The plots at Rutland were planted on May 22, killed September 9, and harvested October 8 (Table 1). Fertilizer was applied at the rate of 200-300-300 per acre. Potatoes were grown in a medium loamy soil. There was adequate moisture. Weed control was good initially; however, Quack grass "took over" late in the season. Seasonal temperatures were normal with adequate rainfall during July, August and September.

The plots at Wolcott were planted June 7, killed by frost, and harvested October 16 (Table 2). Fertilizer was applied at a rate of 144-216-216 per acre. Potatoes were grown in a medium loamy soil. There was adequate moisture. Seasonal temperatures were normal and there was adequate rainfall. Yields were low due to poor storage conditions of the seed pieces prior to planting which reduced sprouting. There were a number of missing hills. Three varieties were discarded.

Plots in South Burlington were planted June 3, killed by frost, and harvested October 8 (Table 3). Fertilizer was broadcast 100-100-100 and side-dressed 80-80-80 per acre. Potatoes were planted in a light sandy soil. There was adequate moisture. Although seasonal temperatures were normal and rainfall was adequate during June, July and August, yields were only fair.

Chip color indices for potato varieties grown in all three Vermont locations in 1974 are given in Table 4.

Cascade yielded very well in all three locations. It appears to be adapted to Vermont. Growers are interested in it, although it has been reported to have some storage problems. Another variety which growers are interested in, Abnaki, was highest at South Burlington. Hudson, a golden nematode-resistant variety, yielded well at Rutland. Iopride, which yielded well in all three locations in 1973, did not do well in 1974. Belle Isle, a new variety which is resistant to fusarium storage rot, did well at both South Burlington and Rutland. Growing conditions were so erratic at Wolcott in 1974 that further conclusions cannot be drawn.

Vermont Table 1. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 18 potato varieties grown at Rutland, Vermont - 1974.

Variety	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids
Belle Isle	429	90.6	81.1	1.080	20.21
Cariboo	391	94.8	68.6	1.081	20.43
Cascade	553	94.5	83.6	1.060	15.99
Cobbler	401	95.5	83.3	1.070	18.10
Hudson	450	89.5	84.1	1.060	15.99
Iopride	437	93.6	84.8	1.065	17.05
Katahdin	364	88.4	81.1	1.065	17.05
Kennebec	504	91.2	84.2	1.065	17.05
Shurchip	416	95.9	83.2	1.061	16.21
Targhee	216	39.4% 4 to 10 oz size		1.067	17.47
B6986-26	372	93.6	85.5	1.073	18.74
B7024-6	354	97.1	83.4	1.077	19.58
BR6626-5	406	94.7	83.3	1.072	18.53
BR6862-2	396	94.0	85.5	1.070	18.10
BR6864-9	461	96.7	82.5	1.065	17.05
CA23-6	344	88.3	81.9	10.76	19.37
CA40-7	454	97.9	87.1	1.067	17.47
F6208	420	95.1	85.2	1.077	19.58
Bayes L.S.D. (0.05)	74			0.003	

Planted - May 22; killed - September 9; harvester - October 8, 1974.

Seedpieces of Targhee spaced 12 inches apart; all other varieties spaced 9 inches.

Fertilizer: 200-300-300.

Vermont Table 2. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 15 potato varieties grown at Wolcott, Vermont - 1974.

Variety	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids
Cariboo	179	93.6	62.2	1.086	21.48
Cascade	379	96.6	81.5	1.075	19.16
Cobbler	204	91.5	65.8	1.08;	20.43
Iopride	155	95.8	71.3	1.075	19.16
Katahdin	139	96.2	75.9	1.078	19.79
Kennebec	194	95.7	70.1	1.082	20.64
Shurchip	217	96.9	77.3	1.073	18.74
Targhee	230	33.2% 4 to 10 oz. size		1.075	19.16
B6986-26	169	96.8	78.2	1.084	21.06
B7024-6	187	93.5	69.5	1.084	21.06
BR6862-2	156	95.0	72.8	1.076	19.37
BR6864-9	138	87.8	40.3	1.070	18.10
CA23-6	180	94.9	84.4	1.084	21.06
CA40-7	232	95.1	75.9	1.076	19.37
F6208	278	93.4	78.0	1.079	20.00
Bayes L.S.D. (0.05)	59			0.003	

Planted - June 7; harvested - October 16, 1974.

Seedpieces of Targhee spaced 12 inches apart; all other varieties spaced 9 inches.

Fertilizer: 144-216-216.

Vermont Table 3. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 20 potato varieties grown at South Burlington, Vermont - 1974.

Variety	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids
Abnaki	346	98.0	91.0	1.067	17.47
Bake King	99	95.2	67.7	1.080	20.21
Belle Isle	263	95.0	76.1	1.079	20.00
Cariboo	100	90.3	39.2	1.076	19.37
Cascade	339	97.9	84.3	1.063	16.63
Cobbler	237	95.8	69.5	1.068	17.68
Green Mountain	204	96.5	77.4	1.077	19.58
Iopride	210	96.3	74.8	1.061	16.21
Katahdin	234	88.9	76.6	1.069	17.89
Kennebec	311	98.6	88.1	1.071	18.53
Norland	208	96.5	73.6	1.060	15.99
Oromonte	223	96.5	82.3	1.075	19.16
Russet Burbank	195	54.4% 4 to 10 oz. size		1.073	18.74
Shurchip	251	97.2	74.7	1.063	16.63
Superior	198	92.7	63.8	1.070	18.10
B6930-6	253	94.8	68.1	1.062	16.42
B7147-8	196	83.5	38.4	1.069	17.89
BR6626-5	202	97.1	77.9	1.070	18.10
BR6863-3	250	89.8	82.6	1.073	18.74
F6208	283	96.2	85.2	1.076	19.37
Bayes L.S.D. (0.05)	74			0.005	

Planted - June 3; harvested - October 8, 1974.

Seedpieces of Russet Burbank spaced 18 inches apart; all others 9 inches.

Fertilizer: 100-100-100 broadcasted; 80-80-80 side-dressed.

Vermont Table 4. Chip color indices for potato varieties grown at Vermont locations - 1974.¹

Variety	Location		
	South Burlington	Rutland	Wolcott
Abnaki	8.1		
Bake King	9.4		
Belle Isle		9.3	9.5
Cariboo	5.4	7.3	8.5
Cascade	8.9	9.6	10.0
Cobbler	7.5	9.7	9.4
Green Mountain	9.6		
Hudson	7.7	10.0	10.0
Iopride	7.8	8.6	10.0
Katahdin	8.0	9.3	9.6
Kennebec	7.6	9.3	9.2
Norland	7.5		
Oromonte	7.7		
Russet Burbank	8.0		
Shurchip	6.9	9.0	9.0
Superior	6.9		
Targhee		10.0	10.0
B6930-6	8.1		
B6986-26		8.2	7.9
B7024-6		7.4	8.0
BR6616-5	8.6	9.9	10.0
BR6862-2		8.9	8.7
BR6863-3	3.5		
BR6864-9			9.2
BR7147-8	7.3		
CA23-6		9.0	9.1
CA40-7		9.5	10.0
F6208	8.4	9.6	9.5
Bayes L.S.D. (0.05)	0.7	0.8	0.6

¹/
/ Chips with lower indices are lighter in color.

VIRGINIA

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Potato Variety and Seedling Trials

Round Tubered Types. Thirty-one potato varieties and seedlings were planted in the "Advanced Trial" (Virginia Table 1); and 29 seedlings with appropriate check varieties were planted in the "Observational Trial" (Virginia Table 2). The trials consisted of single row plots replicated five and four times for the Advanced and Observational Trials respectively. All plots were planted on March 7 and harvested July 16. Each received 100 pounds of N, P, and K banded at planting, one irrigation, and general cultural practices closely approximating commercial production procedures of the area. Thimet 10G insecticide was banded at planting at the rate of 2.5 pounds a.i. per acre on the Observational Trial and Furadan 10G at the same rate on the Advanced Trial.

In addition to the Advanced and Observational Trials, 80 seedlings were planted in single row, non-replicated, 20 hill plots for preliminary screening observations. Twenty-eight were selected for inclusion in the 1975 Observational Trial. Data and observational notes on these seedlings are available on request.

Long Tubered Selections. For the past few years considerable effort has gone into expanding the search for adaptable seedlings that produce long type tubers. In 1974, 50 selections were evaluated. Data on 12 of these selections are in Virginia Table 3. Consistent long shape from year to year appears to be the biggest problem.

Virginia Table 1. Advanced Trial. Yield, chip color, maturity rating, specific gravity, pollution resistance and appearance rating of potato varieties and seedlings grown on the Eastern Shore of Virginia, 1974

	Yield cwt/Acre		Chip Color ^{5/}			Maturity ^{2/}	Air		Specific Gravity
	2" and Larger	Less Than 2"	At Harvest	Cookings	Mean 5		Pollution Rating ^{3/}	Appear Rating ^{4/}	
LaChipper	389 a/	25	4.0	3.6		2	8	2	1.0746
Abnaki	386 a	12	3.0	3.4		5	8	3	1.0784
*B6987-56	379 ab	23	2.0	2.2		5	9	3.5	1.0950
*B6987-29	379 ab	11				4	7	3	1.0844
Alamo	377 ab	24	3.0	3.8		2	6	3	1.0680
Pungo	369 ab	13	2.0	2.8		3	8	2	1.0793
B7154-6	368 abc	33				2	6	4	1.0676
Cascade	365 abc	27	4.0	4.6		3	7	3	1.0811
B6969-2	358 bcd	14	3.0	3.4		2	7	3	1.0728
*B7154-10	344 cde	22	2.0	3.0		3	7	4	1.0650
B7148-1	343 cde	12				3	8	2	1.0714
*B7152-1	343 cde	18	2.0	2.8		4	9	4	1.0821
Wauseon	335 def	21	2.0	2.6		4	4	3	1.0751
Superior	334 def	10	3.0	3.8		2	8	3	1.0765
*B7805-1	334 defg	18	5.0	3.6		4	7	2	1.0729
*BR7051-3	329 efg	17	2.0	2.6		3	6	3	1.0966
*B7155-56	326 efgh	38	6.0	4.2		2	8	3	1.0732
B7148-4	322 efghi	9	2.0	2.8		3	7	4	1.0684
B6516-15	319 efghij	9				5	7	3	1.0822
*B6495-20	312 fghijk	28	4.0	3.6		5	9	3	1.0906
Hudson	307 ghijk	23	4.0	5.2		6	8	3	1.0857
*B6951-5	300 hijk	10	5.0	4.0		4	9	4	1.0772
*B7802-2	300 ijk	7				3	5	3	1.0752
B7200-26	295 jk	16				3	7	2	1.0751
*B6955-35	292 jk1	17	2.0	2.4		2	6	4	1.0822
Norchip	289 jk1	37	3.0	3.0		3	5	2	1.0837
Sebago	288 jk1	22	3.0	3.4		6	8	3	1.0718
B6987-57	285 k1	9				5	6	2	1.0883
B6955-33	285 k1	16				3	8	4	1.0837
B6516-28	283 k1	9				4	8	3	1.0832
B7617-1	267 1	5				5	8	2	1.0767

1/, 2/, 3/, 4/, 5/ footnotes at end of Table 3.

Virginia Table 2. Observational Trial. Yield, chip color, maturity rating, specific gravity, pollution resistance and appearance rating of potato selections on the Eastern Shore of Virginia, 1974

	Yield cwt/Acre		Chip Color ^{5/}			Air		Specific Gravity
	2" and Larger	Less Than 2"	At Harvest	Cookings	Mean 5	Maturity ^{2/}	Pollution Rating ^{3/}	
*B7839-7	321 a 1/	31	4.0	4.0		3	7	1.0676
*B7152-14	285 ab	15	4.0	4.2		4	6	1.0687
*B7768-4	283 ab	14	3.0	3.8		3	6	1.0822
*B7772-5	278 ab	8	3.0	4.0		2	6	1.0706
B7620-4	274 abc	17				4	4	1.0770
*B7139-4	270 bcd	13				6	6	1.0818
B7632-3	269 bcd	29				6	6	1.0792
B7621-2	262 bcde	13				5	7	1.0731
B7597-1	249 bcdef	22				2	3	1.0676
*B7252-3	247 bcdef	23	4.0	3.0		4	4	1.0701
*B6951-1	277 cdefg	22	2.0	2.8		3	4	1.0792
B8019-7	222 defgh	27				5	4	1.0758
B6516-20	216 efghi	26				6	7	1.0870
B7807-2	204 fghi	18				3	5	1.0891
B7649-5	203 fghi j	11				3	5	1.0725
*B7825-5	201 fghi j	41	2.0	2.2		2	6	1.0731
*B7590-6	201 fghi j	17	2.0	3.0		1	4	1.0688
B7698-1	201 fghi j	10				5	5	1.0762
B6503-2	198 fghi jk	15				5	8	1.0738
*B7164-25	197 fghi jk l	17	3.0	3.0		3	4	1.0770
B7590-1	193 ghi jk l	24				4	8	1.0743
B7153-29	178 ghi jk l	23				2	4	1.0754
B7141-1	176 ghi jk l	18				4	5	1.0880
B7031-N2	173 hi jk l	22				3	8	1.0800
64C2-3	164 i jk l	33				2	7	1.0690
FL162	157 jk l	35				6	7	1.0751
B7139-6	155 k l	26				2	3	1.0796
7SW-11	137 k l	28				1	1	1.0650
B7167-2	130 l	21				1	4	1.0759

1/, 2/, 3/, 4/, 5/ footnotes at end of Table 3.

Virginia Table 3. Advanced Yield Trial of Long Tubered Potato Selections. Yield, maturity rating, pollution resistance, appearance rating of potato selections on the Eastern Shore of Virginia, 1974

	Yield cwt/Acre		Chip Color ^{5/}		Mean 5	Air		Remarks
	2" and Larger	Less Than 2"	At Harvest	Color		Pollution Rating ^{3/}	Appear. Rating ^{4/}	
B7610-1	258 a ^{1/}	19			4	5	3	Round type
B7165-2	257 a	19			3	6		Round type
*B7152-12	250 a	20			3	7	4	All round
*B7679-9	237 ab	14	6.0	6.2	3	7	3	Part russet
B7694-1	233 ab	14			3	5	4	All round
Nampa	221 abc	32			5	8	2	Sprouts
Targhee	219 abc	37			4	8	2	Sprouts
Nor. Russet	199 bcd	45			2	8	3	Few sprouts
*B7669-2	192 cd	31	6.0	5.4	3	6	3	Nice shape
*B7196-23	183 cd	16	4.0	5.2	2	9	4	Not long enough
*B7160-4	167 de	45	2.0	3.0	3	8	3	
*B7147-8	139 e	34	1.0	2.2	2	6	3	Heavy russet

^{1/}Yields followed by a letter in common are not significantly different, 1% level of probability.

^{2/0} = Very, very early

1.0 = Early (Haig, Cobbler, Onaway)

2.0 = Medium early (Superior or slightly earlier)

3.0 = Medium (Pungo, Norchip)

4.0 = Medium late (Wauseon)

5.0 = Late (Hudson)

6.0 = Very late (Sebago)

^{3/} 0 = Completely dead

1.0-3.0 = Almost all dead, severe speckling of leaves.

4.0-5.0 = Considerable loss of lower leaves, severe speckling of remaining leaves, very little resistance.

6.0-7.0 = Very few dead leaves, moderate speckling of remaining leaves, considered fairly tolerant.

8.0 = Very little speckling, resistant.

9.0 = No speckling of leaves, resistant.

^{4/}Appearance Rating 0 = very ugly

4.0 = very, very beautiful

^{5/}Chip Color 1.0 thru 4.0 = light color chips; 5.0 = light brown and barely marketable;

6.0 thru 14.0 = brown to black.

WASHINGTON

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Results of Variety Trials 1974

Advanced Selections. Fourteen numbered selections, two named varieties and three seed sources of Russet Burbank were grown at four locations. Two locations were on the WSU farm near Othello and two in commercial potato fields, one near Pasco and the other near Moses Lake.

The Othello Trial I field was fertilized with 2200 pounds of 16-16-16 fertilizer. The land was plowed and disked and planted to a cover crop of winter rye. On April 25 the field was rotovated to a depth of six to eight inches at which time the cover crop was 16 to 18 inches high. The plots were two rows wide and 28 feet long. Lines A6135-4, A63184-6, A64206-4, A6371-2, Russet Burbank (Canada) and Russet Burbank (single drop) were planted in two replications while the others had only one. Each variety was band fertilized through the planter with rates of 100, 200 and 300 pounds of N, P_2O_5 , and K_2O per acre. The seed was planted on May 17.

All seed was grown at Bellingham, Washington except for two sources of virus-tested Russet Burbank seed (Canada and Montana). The potatoes were harvested on October 11.

The Othello Trial II field was planted May 17 directly into a cover crop of winter rye. Fertilizer treatments, plot-size and experimental design were the same as Othello Trial I. Lines W338-1, W326-1, WC314-2, 321-65, A661223, A6371-2, Russet Burbank (Canada) and Russet Burbank (Montana) had two replications while the others had one.

Only yield data from this experiment is included in this report, however, extensive studies on wound healing of these selections is currently being conducted.

The Pasco, Washington Trial was a commercial field under solid set sprinkler irrigation. The experimental design was a randomized complete block with four replications and three fertilizer rates of 50, 100 and 200 pounds of N, P_2O_5 , and K_2O per acre applied at planting time. Additional nitrogen was applied through the sprinkler system. Each plot was one row wide (34") and 40 feet long. The seed was planted on April 10 and the tubers were harvested on September 4.

The Moses Lake, Washington Trial was similar to the one at Pasco except that it was planted directly in wheat cover crop and was watered with a center-pivot irrigation system. The fertilizer rates were 100, 200 and 300 pounds of N, P_2O_5 , and K_2O per acre applied at planting time. Additional nitrogen was applied through the sprinkler system.

Screening Trials. In the screening trials 92 selections which were new to our variety testing program were planted at the Washington State University farm near Othello, Washington. To compare these new selections with the

predominate Russet Burbank variety a modified split-plot design was used. Two rows of clones were planted adjacent to a single row of Russet Burbank. Thus each Russet Burbank plot was paired with clones on each side and received two fertility rates. Rill irrigation was used and pest and disease control was on a preventive basis.

In these two trials there was some injury to some of the plants in a few plots at the time of the first cultivation.

The seed in Trial I was planted directly into a cover crop of winter rye. The plots were one row wide and 28 feet long. Fertilizer rates of 200 and 300 pounds of N, P_2O_5 , and K_2O per acre were banded at planting time. The seed was planted April 9-11 and the tubers were harvested on November 4.

Protein-Proteinase Inhibitor Studies. Protein-proteinase inhibitors appear to be the major storage proteins in potato tubers. These proteins have molecular weights of 4000 to 40,000. They have been shown to accumulate in the apical cortex of tubers in high concentrations (over 10% of the soluble protein) and in lesser amounts in other tissues of the tuber. A survey of the concentration of three inhibitors in potato tubers among available varieties has been initiated. To date about 90 clones have been screened. Along with this survey a study has been initiated on the effects of environmental parameters, including location and fertilizer rate on the concentration of these inhibitors in ten varieties of potatoes.

Washington Table 1. Advanced variety trials at Othello, Pasco and Moses Lake, Washington, 1974.

Clone	Fert. Rate	Othello I			Hollow 3/ Heart %	Othello II			Pasco			Moses Lake			Tuber 2/ Descrip.
		CWT/A	% 1's	Sp. Gr. 1/ Heart		CWT/A	% 1's	CWT/A	% 1's	CWT/A	% 1's	CWT/A	% 1's		
A6135-4	1	583	77	82	0	475	75	556	81	408	60	LW			
	2	480	69	89	0	538	74	522	83	353	60	LW			
	3	505	63	82	0	604	71	583	84	357	58	LW			
A66122-3	1	508	50	85	0	405	70	480	82	300	43	LR			
	2	526	28	84	20	502	74	546	85	412	43	LR			
	3	476	40	86	7	489	72	478	79	300	51	LR			
W284-1	1	467	72	87	0	384	66	244	85	275	70	LR			
	2	458	71	83	7	442	71	338	82	237	65	LR			
	3	402	72	76	0	533	71	379	82	177	71	LR			
A6371-2	1	493	69	84	0	472	76	378	83	246	65	LR			
	2	355	69	80	0	458	73	420	77	329	68	LR			
	3	409	67	81	0	495	68	420	78	290	56	LR			
W338-1	1	416	68	83	0	427	75	287	73	194	47	LR			
	2	498	81	85	0	443	78	302	78	237	68	LR			
	3	340	74	81	0	482	77	392	78	210	63	LR			
A63184-6	1	410	73	78	0	596	82	429	83	299	69	LR			
	2	456	70	77	0	637	84	428	83	349	68	LR			
	3	334	72	75	0	601	79	456	76	359	71	LR			
A503-42	1	467	53	78	0	414	64	458	71	353	58	RW			
	2	317	64	87	20	447	74	485	67	326	66	RW			
	3	387	80	83	45	450	61	465	63	276	47	RW			
A6334-19	1	434	80	74	0	401	68	414	82	299	68	LR			
	2	294	69	84	0	469	72	444	81	330	70	LR			
	3	362	78	80	0	467	74	442	84	318	61	LR			
A59197-5	1	280	59	82	0	406	55	461	78	333	67	LR			
	2	456	59	73	0	522	59	464	81	361	68	LR			
	3	332	51	77	0	560	70	461	80	291	64	LR			
A64206-4	1	325	71	82	0	283	63	363	78	131	61	LR			
	2	369	70	85	0	450	65	433	82	227	51	LR			
	3	345	67	82	0	467	71	466	80	152	54	LR			

Clone	Fert.	Rate	Othello I			Othello II			Pasco		Moses Lake		Tuber 2/ Descr.
			% 1's	Sp. Gr.	1/ Hollow 3/ Heart %	CWT/A	% 1's	CWT/A	% 1's	CWT/A	% 1's	CWT/A	
W280-11	1		66	91	0	327	544	390	72	277	49		LR
	2		68	84	13	307	456	402	77	123	48		LR
	3		79	89	0	324	486	458	73	260	63		LR
321-65	1		58	105	0	349	391						LR
	2		79	105	26	200	371						LR
	3		80	105	20	339	497						LR
W326-1	1		75	84	0	228	391						LR
	2		63	83	20	198	371						LR
	3		70	85	0	269	497						LR
WC314-2	1		65	95	0	233	342						LR
	2		71	95	0	220	421						LR
	3		67	88	13	177	467						LR
WC304-4	1						439						LR
	2						461						LR
	3						513						LR
Norgold	1							378	77	194	51		LR
	2							395	80	256	59		LR
	3							338	81	149	55		LR
Russet	1		65	84	0	469	464	496	79	298	58		LR
	2		65	84	0	390	406	488	77	268	49		LR
	3		60	81	0	413	491	570	78	305	56		LR
Mt. V.T.	1		57	82	0	395	436	491	76	339	57		LR
	2		64	79	0	391	436	490	75	380	56		LR
	3		57	83	0	405	493	529	77	361	61		LR
Canada V.T.	1		69	82	3	377	348						LR
	2		68	85	0	494	491						LR
	3		70	82	0	546	527						LR
Burbank	1												LR
	2												LR
	3												LR
WA	1												LR
	2												LR
	3												LR

1/ 1.0 omitted
2/ LR=long russet, LW=long white, RW=round white.
3/ Based on 30 tubers for each clone.

Washington Table 2. Screening Trial I with paired plots of the Russet Burbank variety.

Clone	Fert.	CWT/A		Spec. Gravity ^{1/}		H.H. ^{3/} %	Tuber Descrip. ^{2/}
		Clone	R.B.	Clone	R.B.		
A6371-2	1	530	527	90	82	2	LR
	2	661	591	91	80	3	LR
A63126-9	1	533	647	88	77	10	OR
	2	564	605	88	80	20	OR
A66102-16	1	608	530	92	80	2	LR
	2	660	589	88	80	3	LR
A66107-44	1	633	624	88	88	2	LR
	2	566	664	88	87	2	LR
A66107-51	1	469	453	82	81	0	LR
	2	300	529	80	84	2	LR
A66122-3	1	508	612	85	84	3	LR
	2	591	619	77	83	3	LR
A67142-1	1	658	643	95	82	2	OW
	2	628	708	91	82	2	OW
A67490-3	1	464	498	88	81	8	LR
	2	442	428	88	82	0	LR
A67524-1	1	583	658	77	82	0	LRed
	2	744	705	75	81	0	LRed
A6830-3	1	530	720	91	79	0	LR
	2	628	744	94	79	2	LR
A68113-4	1	644	638	90	84	0	LR
	2	1021	627	89	80	0	LR
A68390-8	1	397	525	89	82	0	OW
	2	441	600	86	81	0	OW
A68678-1	1	647	575	84	82	27	LRsm
	2	658	594	82	83	27	LRsm
A68681-1	1	705	738	83	76	0	LR
	2	749	788	85	79	0	LR
A68683-4	1	472	594	86	84	12	LR
	2	494	616	90	88	17	LR
A68683-7	1	542	588	81	78	0	LR
	2	502	733	78	81	3	LR
A68683-14	1	558	573	88	82	5	LR
	2	658	677	83	81	0	LR
A68686-22	1	675	638	84	82	0	LR
	2	680	702	82	81	0	LR
A68709-2	1	527	733	86	78	2	LR
	2	694	680	87	85	3	LR
A69327-5	1	488	599	84	76	0	LR
	2	488	566	84	78	0	LR
A69395-1	1	322	547	85	84	8	LR
	2	427	544	92	79	0	LR

Washington Table 2, continued.

Clone	Fert.	CWT/A		Spec. Gravity ^{1/}		H.H. ^{3/}	Tuber
		Clone	R.B.	Clone	R.B.	%	Descrip. ^{2/}
A69657-4	1	444	578	89	86	9	OW
	2	505	660	89	87	0	OW
A69786-4	1	622	528	103	82	13	LR
	2	647	572	102	83	20	LR
A69827-2	1	677	650	86	80	2	LRed
	2	783	633	85	83	0	LRed
A69827-4	1	552	616	82	80	10	LR
	2	574	699	78	84	5	LR
A69860-1	1	533	649	86	87	6	LR
	2	555	611	85	86	0	LR
A69868-2	1	538	522	89	83	0	LW
	2	649	538	83	82	0	LW
BR6446-2	1	638	625	86	86	2	RW
	2	824	683	78	86	1	RW
BR6626-5	1	630	547	80	82	2	OW
	2	630	514	80	79	3	OW
BR6820-26	1	294	564	81	80	0	RW
	2	297	602	79	85	0	RW
BR6862-2	1	411	544	80	82	0	OW
	2	381	544	73	81	23	OW
BR6864-IE	1	591	500	83	79	6	OW
	2	680	605	83	83	2	OW
BR6864-6E	1	483	644	79	89	6	RW
	2	566	744	79	91	0	RW
BR7085-1	1	550	561	87	81	8	LR
	2	478	572	82	81	10	LR
BR7089-6	1	511	590	87	85	12	OW
	2	564	677	85	79	17	OW
BR7093-48	1	500	644	81	89	27	RW
	2	683	744	73	91	27	RW
BR7103-I	1	511	563	70	83	23	OW
	2	633	638	71	79	27	OW
BR7103-2	1	500	511	85	83	20	LR
	2	688	577	92	83	12	LR
BR7104-10	1	572	511	80	83	0	OW
	2	627	577	80	83	0	OW
CA11-13	1	505	649	70	87	0	RR
	2	487	611	77	86	0	RR
CA26-2	1	561	522	80	83	30	OW
	2	627	538	81	82	13	OW
CA46-11	1	544	572	85	85	3	OB
	2	522	555	85	79	0	OB
CA46-31	1	251	486	75	83	0	LB
	2	333	428	79	82	0	LB

Washington Table 2, continued.

Clone	Fert.	CWT/A		Spec. Gravity ^{1/}		H.H. ^{3/} %	Tuber Descrip. ^{2/}
		Clone	R.B.	Clone	R.B.		
CA46-34	1	480	730	69	81	2	OW
	2	378	700	66	80	2	OW
CA55-24	1	447	633	86	80	5	OW
	2	336	489	82	82	20	OW
CA60-24	1	428	680	89	87	17	RB
	2	533	688	85	79	20	RB
CA61-3	1	433	583	84	82	6	RW
	2	488	716	86	85	13	RW
CA63-I	1	433	649	86	87	0	OW
	2	566	611	86	86	0	OW
CAM67-2	1	527	480	78	81	3	OW
	2	508	513	70	86	15	OW
CC05-17	1	533	669	87	83	2	OB
	2	572	749	85	82	3	OB
CC06-5	1	475	625	86	86	3	OW
	2	611	683	82	88	0	OW
CC06-12	1	689	561	78	80	25	LW
	2	627	552	76	80	20	LW
CC54-4	1	680	676	78	80	2	OW
	2	719	700	80	83	0	OW
CC56-8	1	439	505	86	82	1	LW
	2	483	525	83	82	1	LW
CC76-1	1	511	638	82	79	1	OW
	2	555	727	80	82	0	OW
CD03-4	1	438	766	75	83	0	OW
	2	500	760	75	80	0	OW
CD08-21	1	350	638	90	79	0	LR
	2	483	677	91	82	0	LR
CD08-30	1	392	666	88	83	3	LR
	2	422	644	90	84	10	LR
CD106-6	1	533	666	83	79	7	LW
	2	527	744	81	82	3	LW
CD117-6R	1	300	649	74	87	3	RR
	2	300	611	75	86	0	RR
CD119-7	1	566	444	85	85	0	LR
	2	760	555	87	79	0	LR
CD124-1R	1	316	505	72	81	33	LR
	2	383	694	74	84	0	LR
CD137-5R	1	522	472	99	85	33	LR
	2	538	461	100	83	6	LR
CD138-3	1	694	505	88	81	0	OW
	2	722	694	90	84	0	OW
CD138-4R	1	466	638	72	76	6	LR
	2	416	627	68	79	13	LR

Washington Table 2, continued.

Clone	Fert.	CWT/A		Spec. Gravity ^{1/}		H.H. ^{3/}	Tuber
		Clone	R.B.	Clone	R.B.	%	Descrip. ^{2/}
CD138-11R	1	438	594	70	78	3	OR
	2	403	694	65	80	0	OR
CD141-26	1	366	583	90	82	12	OB
	2	444	716	80	85	27	OB
ND6634-2R	1	378	625	75	87	2	RRed
	2	480	683	74	88	4	RRed
ND7710-5	1	347	566	74	84	0	OW
	2	364	567	80	83	0	OW
ND7878-1	1	355	611	65	81	20	RW
	2	361	694	72	83	27	RW
ND8297-1	1	300	558	77	83	0	RW
	2	303	555	75	80	0	RW

^{1/} 1.0 omitted

^{2/} LR=long russet, OR=oblong russet, OW=oblong white, LW=long white, RR=round russet, RW=round white, LB=long buff, RB=round buff, LRed=long red, RRed= round red, LRsm=long russet smooth.

^{3/} Based on 30 tubers, for each clone.

Washington Table 3. Screening Trial II with paired plots of the Russet Burbank variety.

Clone	Fert.	CWT/A		Spec. Gravity ^{1/}		H.H. ^{3/} %	Tuber Descrip. ^{2/}
		Clone	R.B.	Clone	R.B.		
B5141-6	1	423	609	93	83	0	OW
	2	511	631	85	79	0	OW
B6936-119	1	483	598	86	82	0	OW
	2	450	681	78	81	6	OW
B6985-16	1	406	824	93	84	0	OW
	2	406	730	90	90	0	OW
B6985-36	1	478	598	85	82	0	LB
	2	532	566	85	84	0	LB
B6987-54	1	472	824	79	84	0	LB
	2	472	873	67	90	1	OB
B6987-57	1	703	637	93	88	0	OW
	2	631	741	93	83	3	OW
B6987-187	1	555	708	84	86	0	OW
	2	555	878	80	83	0	OW
B6987-201	1	505	598	102	82	0	OW
	2	730	758	96	84	3	OW
B6987-224	1	565	725	76	85	3	OW
	2	637	856	75	83	0	OW
B6998-15	1	346	747	89	83	0	OW
	2	428	686	88	86	0	OW
B7024-60	1	642	763	104	90	0	OW
	2	730	769	102	84	3	OW
B7024-81	1	813	747	100	83	0	OW
	2	631	686	98	86	3	OW
B7139-4	1	565	505	100	77	0	OW
	2	582	670	95	81	0	OW
B7151-4	1	818	726	99	85	3	OB
	2	791	856	92	83	3	OB
B7167-2	1	296	686	77	90	0	OW
	2	296	703	78	84	0	OW
B7572-3	1	247	763	79	90	0	OW
	2	313	769	84	84	0	OW
B7583-6	1	581	598	86	82	7	LR
	2	703	681	85	81	3	LR
B7583-7	1	357	609	106	83	0	LR
	2	412	631	98	79	3	LR
B7583-19	1	587	637	82	88	0	OR
	2	565	741	80	83	3	OR
B7589-6	1	675	675	97	89	0	OW
	2	785	741	89	83	3	OW

Washington Table 3, continued.

Clone	Fert.	CWT/A		Spec. Gravity ^{1/}		H.H. ^{3/} %	Tuber Descrip. ^{2/}
		Clone	R.B.	Clone	R.B.		
B7589-8	1	571	620	94	89	0	OW
	2	565	692	86	81	0	OW
B7664-6	1	686	708	88	86	3	OW
	2	736	878	83	83	3	OW
Kennebec	1	620	505	90	77	0	OW
	2	703	670	83	81	3	OW
Russet	1	774*	686	83	84	0	LR
Burbank	2	763*	703	80	82	0	LR

^{1/} 1.0 omitted

^{2/} LR=long russet, LB=long buff, OB=oblong buff, OW=oblong white.

* Different seed source

^{3/} Based on 30 tubers for each clone.

WASHINGTON

William G. Hoyman

Potato Breeding

The objective of the potato-breeding project in Washington is to obtain russet-skin varieties having desirable horticultural characteristics for processing and the fresh market, and resistance to important pathogens occurring in the Western Region. Nooksack, released in 1973, was the first russet resulting from this project. Other russets that appear to be adapted to certain locations in the Western Region are WC230-14, WC285-18, WC285-141, WC-285-146 and W330-1. The WC russets were selected and evaluated by James Twomey, San Luis Valley Experiment Station, Center, Colorado.

July Harvest Trial (Table 1). The July harvest experiment contained three russet clones (Table 1) that form tubers early. Three rates of N were applied to determine if this element would affect total yield, percent No. 1's, hollowness, common scab, specific gravity, skinning and russetting. Previous to plowing, the entire field received a broadcast application of 150, 88 and 99 pounds per acre of N, P and K, respectively. Additional plow-down applications of 150 and 300 pounds of N per acre were broadcast on other portions of the field so as to have 300 and 450 pounds per acre of plow-down N. At planting, a starter fertilizer containing 60, 12 and 25 pounds per acre of N, P and K was banded. Simultaneously, di-systom was banded at three pounds active ingredient per acre. Systox spray was used for foliar insect control. Each clone was randomized four times with 20 hills per replicate. The 1-1/2 to 2 ounce seed pieces were cut March 12, treated with captan dust and planted immediately. Seed was spaced 12 inches within and 38 inches between rows.

Although plants in plots receiving different amounts of N emerged simultaneously, there was an inverse relationship between amount of N and vine size. Plants receiving 510 pounds of N per acre were conspicuously smaller all summer. With the exception of ND6993-13, there was an inverse relationship between total yield and amount of N. This was especially true for W284-1. There was also a progressive decrease in number of tubers per hill as rate of N increased. The data in other categories of Table 1 were not affected. A moderate amount of skinning on ND6993-13 and Norgold Russet can be attributed to the fact that both have thin skin and vines were not eliminated until four days prior to harvest. This short interval, however, had very little effect on the skin of W284-1 is a very important characteristic for marketing early-harvested russets in July and August. Vines of ND6993-13 and Norgold Russet should be removed approximately two weeks before harvest to reduce skinning. By not removing vines of W284-1 at the same time, an extra period of growth would add to the yield--especially when W284-1 sets more tubers.

September Harvest Trial (Table 2). The September harvest trial (Table 2) of new russet clones received the same kind and amount of fertilizer used on the lowest nitrogen plot (210 pounds per acre) of the July harvest trial. Preparation of the cut seed for planting April 1 and other producers were the same as for the July harvest trial.

The WC russets have shown promise in the San Luis Valley of Colorado and at certain areas of California. All of them had respectable yields and high percentages of No. 1's--as compared to 66 percent for Russet Burbank. All but three were more resistant to Verticillium albo-atrum (Wilt) than Russet Burbank and eight of the 11 were resistant to a common strain of Phytophthora infestans (late blight). WC325-1 and WC345-15 are potential processing varieties. Both are high yielders, have high dry matter content, very resistant to V. albo-atrum and resistant to a common strain of P. infestans.

Reaction to Meloidogyne hapla (Table 3). Thirteen clones were grown in nematode-infested field H15 to determine their reaction to this nematode. Each clone was replicated twice with 20 hills per replicate. No systemic insecticide was used for fear it would inhibit nematocidal activity. Twenty-five tubers were selected at random from each replicate and observed for external galls and internal symptoms. The data show rootknot-nematode infection of tubers was slight in 1974.

Washington Table 1. July harvest trial of russet-skin clones receiving three per acre rates of nitrogen. Planted March 12 and harvested July 19.

Clone	Ave number tubers/hill	Cwt. per acre					Common scab	Specific gravity	Skinning	Tuber ^{1/}	
		Total	Percent		oblong	Type					
			No. 1's	Hollow							
150 lbs. plowed down and 60 lbs. banded at planting											
W284-1	10.5	514	90	0	Trace	1.078	V. Sl.	Abundant	oblong		
ND6993-13 ^{2/}	6.2	362	93	0	Trace	1.082	Mod.	V. Sl.	oblong	growth cracks	
Norgold Russet	8.5	431	90	0	Trace	1.078	Mod.	V. Sl.	oblong		
300 lbs. plowed down and 60 lbs. banded at planting											
W284-1	9.4	445	94	0	Trace	1.079	V. Sl.	Abundant	oblong		
ND6993-13	6.2	390	87	0	Trace	1.080	Mod.	V. Sl.	oblong	growth cracks	
Norgold Russet	7.3	362	90	0	Trace	1.084	Mod.	V. Sl.	oblong		
450 lbs. plowed down and 60 lbs. banded at planting											
W284-1	7.1	284	94	0	Trace	1.083	V. Sl.	Abundant	oblong		
ND6993-13	5.1	312	95	1	Trace	1.079	Mod.	V. Sl.	oblong	growth cracks	
Norgold Russet	6.3	293	93	0	Trace	1.083	Mod.	V. Sl.	oblong		

^{1/} V. Sl. = very slight, Mod. = moderate.

^{2/} Also known as Minnesota Russet.

Table 2. September harvest trial of russet-skin clones, Prosser, Washington. Planted April 1 and harvested September 25, 1974.

Clone	Cwt. per acre		Common 1/ scab	Verti- cillium ^{2/} wilt		Late- 3/ blight	Specific Gravity	Chip ^{4/} color	Tuber characteristics
	Total	No. 1's Percent Hollow		7/23	8/17				
WC230-14	650	90	0.0	Trace	0.00	1.00	-	1.081	8 Oblong
WC285-18	753	89	0.0	Trace	0.50	1.00	-	1.089	4 Oblong, cracks
WC285-83	602	90	0.0	Trace	1.50	3.00	-	1.093	5 Oblong
WC314-2	523	92	0.6	Trace	0.50	2.50	+	1.088	7 Oblong
WC316-1	615	92	4.0	Trace	2.00	4.00	-	1.081	5 Oblong
WC316-7	822	90	1.0	Trace	0.00	0.00	-	1.085	3 Oblong, growth cracks
WC325-1	667	93	1.5	Trace	0.00	0.00	-	1.103	7 Oblong, slight russet
W330-1	681	96	0.5	Trace	1.50	3.00	+	1.083	3 Oblong, Rhizoctonia sclerotia
WC345-15	849	93	5.6	Trace	0.00	0.50	-	1.095	2 Oblong
BC7679-4	812	94	13.5	Trace	0.00	2.00	+	1.083	8 Oblong, internal discoloration
BC7812-1	801	72	0.0	Trace	0.00	0.50	-	1.082	6 Oblong, rough, growth cracks
Russet									
Burbank	832	66	0.0	Trace	1.25	2.75	+	1.085	8 Long, rough, knobs, growth cracks

^{1/} Very slight amount.

^{2/} 0 = no vine symptoms, 5 = dead.

^{3/} Detached leaf method with common strain.

^{4/} Chipped immediately following harvest.

Washington Table 3. Reaction to Meloidogyne hapla.

Clone	Number of tubers		
	Total	Galled	Galless with internal symptoms
WC230-14	50	0	5
W284-1	50	0	6
WC285-18	50	0	5
WC285-83	50	0	7
WC314-2	50	0	1
WC316-1	50	0	5
WC316-7	50	0	12
WC325-1	50	0	7
W330-1	50	0	4
WC345-15	50	0	12
BC7679-4	50	0	10
BC7812-1	50	0	8
ND6993-13	50	0	9

West Virginia

R. J. Young⁽¹⁾, K. L. Deahl⁽²⁾, and R. L. Williams⁽³⁾

Potato Late Blight

Multigenic Late Blight Test 1974. The blight test was conducted in field plots located along the Tygart River near Huttonsville, West Virginia. Test lines were hand planted on June 6, and consisted of two replications of five hills each. Fertilizer and disyston were incorporated into planting furrows according to recommendations of soil analysis and manufacture. Guard rows were planted with Abnaki while every third row throughout the plot was planted with WV5-3 (R₂R₄) and WV11-32 (R₂R₃). "Inoculator rows" were inoculated on July 25, with an active zoospore-sporangial suspension of race-1,2,3,4 of P. infestans (W.Va. isolates 167 and H-127). Cultures, eight-ten days old, were produced on Kennebec tuber slices and on Lima bean slants and plates. Inoculations were carried out during the evening hours when temperature and moisture were more nearly optimal. "Blight spots" were found on inoculated foliage the following Monday July 29, indicating the inoculation of July 25 had been successful. Late blight lesions were also found in home gardens on the varieties Kennebec and Red Pontiac on July 25 indicating the indigenous race of P. infestans (race-1,4) had caused initial infections on or about July 18. Initial evaluations were made on August 1, and weekly thereafter through September 12. Results of the 1974 late blight seedling test are presented in West Virginia Table 1.

Integrated Control of Potato Late Blight. West Virginia approaches the control of potato late blight through the development of breeding lines possessing multigenic resistance. Traditionally, this important disease has been controlled by the frequent application of fungicides. Reasonable control is provided by these pesticides if ground machinery can be used in the fields. Frequently, however, extended late season rainy periods interfere with spraying and it is during this critical period of tuber development that temperature and moisture are nearly optimal for disease development. Significant economic losses to the stored tuber crop have been experienced by West Virginia potato growers in recent years including 1974.

Neither chemical nor biological control of late blight appears to be sufficient alone to avoid serious losses, especially in growing seasons with abundant rain. Therefore, late blight might be controlled better and more economically by integrating multigenic resistance with fungicidal sprays based on blight forecasting.

Experiments were conducted using varieties which vary in monogenic and multigenic resistance. Plots were sprayed weekly with a standard fungicide, and once every two, three, and four weeks. The results presented in West Virginia Table 2 show that Abnaki, highly susceptible to P. infestans must be protected by weekly sprays. Fewer sprays resulted in significant reductions in yield. Losses ranged from 38%-65% depending on the spray interval. Whereas, BR 5991-WV16 and B6026-WV5 each produced equivalent yields regardless of spray intervals. The data supports the concept of integrated control of late blight of potato.

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1974 Field No.	Pedigree	Foliage Readings ¹						
		8/1	8/9	8/15	8/21	8/29	9/5	9/12
302	Abnaki	2+	3+	4+	5	5	5	5
302	Alamo	0	2+	4+	5	5	5	5
303	Calrose	0	1	1+	2-	2	3-	4+
306	Irish Cobbler	2+	3+	4+	5	5	5	5
307	Katahdin	2	3+	4+	5	5	5	5
308	Kennebec (R ₁)	0	2+	3-	4	5	5	5
312	Penchip (R ₃)	1	2-	2+	2	4	4+	5
313	Pentland Ace (R ₃)	1-	2	3+	5-	5	5	5
314	Russet Rural	1+	3+	4+	5	5	5	5
315	Sebago	1-	2+	3+	4-	5-	5	5
316	B5141-6 (Lenape)	0	2-	3-	4+	5	5	5
317	B3682-WV 1	0	1	2	2+	5	5	5
318	B3720-WV 4	0	0	2	3-	4+	5	5
319	B5264-WV 6	0	2-	3-	3+	4+	4+	5
320	B5422-WV 9	0	1+	2-	3-	5	5	5
321	B5662-WV 4	0	1-	1	1+	2	2-	2+
322	B5662-WV 13	0	1-	1+	2+	4+	4+	5
323	B5670-WV 1	0	1+	3-	3+	5	5	5
324	BR5991-WV 13	0	1-	2	3	4	4+	5
325	BR5991-WV 16	0	0	2	2+	3-	4+	5
326	BR5991-WV 21	0	1+	2-	2	3-	3+	4+
327	BR5991-WV 25	0	1+	2+	3	4	5	5
328	B6039-WV 2	0	1	2	4	5	5	5
329	B6039-WV 6	0	1-	1+	2-	2+	3	4+
330	B6039-WV 9	0	2-	3-	3+	5	5	5
331	B6043-WV 6	0	1-	2-	2	3+	4+	5
332	6086-WV 21	0	1-	2	2+	4+	4+	5
333	B6140-WV 1	1+	2	3+	4+	5	5	5
334	B6140-WV 3	0	1+	3*	4+	4+	5	5
335	B6649-WV 1	0	1+	3-	3	5-	5	5
336	B6653-WV 7	0	1-	2	2+	3+	3+	5
337	B6655-WV 1	0	1+	2	2+	3+	3+	5
338	B6667-WV 1	0	1+	2-	2	3+	3+	5
339	B6928-WV 1	0	1+	3+	5	5	5	5
340	B6928-WV 2	0	1	2	3-	4+	5	5
341	B6928-WV 4	1-	1+	3	4+	5	5	5
342	B6928-WV 6	0	2	2+	4+	5	5	5
343	B6928-WV 8	0	2	3+	4+	5	5	5
344	B6928-WV 13	1-	2+*	5	5	5	5	5
345	B6928-WV 14	0	1-	3-	3-	3+	4	5
346	B6028-WV 6	0	1-	1+	1+	2	3	4
347	B6026-WV 5	0	1-	1+	2	3	3+	5

457	B6097-9	0	1	3	3+	5-	5	5
450	B6139-11	0	1	2+	3+	5-	5	5
459	B6246-1	1	3-	4+	5	5	5	5
451	BR6255-1	0	1	3+	4+	5	5	5
452	BR6265-1	1-	2	3+	4+	5	5	5
453	BR6287-14	1+	2-	3	3	4+	5	5
454	BR6291-19	0	1+	2+	4	5	5	5
460	BR6312-2	0	1+	3	4	5-	5	5
455	BR6315-6	0	1-	2+	4	5	5	5
456	BR6327-5	0	1-	4	4+	5	5	5
393	BR6446-2	1-	1+	4	4+	5	5	5
394	BR6463-2	0	1	3	4+	5	5	5
395	B6495-14	0	1+	2+	3+	4+	5	5
390	BR6558-16	0	1+	3-	3+	5	5	5
391	BR6573-11	2-	3+	5	5	5	5	5
392	B6596-1	1	1+	3	4	5	5	5
396	B6705-10	0	2-	3+	4	5	5	5
397	B6761-11	0	1-	1-	2-*	4+	5	5
396	B6705-10	0	2-	3+	4	5	5	5
397	B6761-11	0	1-	1-	2-*	4+	5	5
398	B6761-12	0	1-	2-	2	3	4+	5-
399	B6782-1	1	2	3+	4+	5	5	5
400	B6815-14	1-	1	2	2+	4-	5	5
401	BR6879-5	0	1+	3+	5	5	5	5
461	Atzimba	0	1-	1-	2-	2+	2+	2+
462	Arenac	0	2	3+	4	5	5	5
463	Avon	1	2	4+	5-	5-	5	5
464	Boone	0	2	2+	3	4	4+	5
465	Catoosa	1-	2	3+	3+	4+	5-	5
466	Cherokee	1	2	4+	5-	5	5	5
467	Delus	1+	2+	4+	5-	5	5	5
468	Fundy	1	3	4	4+	5	5	5
469	Hunter	1	2-	3+	5-	5	5	5
470	Merrimac	1	2	2+	3	4+	5	5
471	Onaway	2	3+	4+	5-	5	5	5
472	Plymouth	0	2+	4	4	4+	5	5
473	Pungo	1	2+	4	4+	5	5	5
474	Saco	1+	2-	4	4+	5	5	5
475	Superior	1	2+	4	5-	5	5	5
476	X96-56	1-	2-	2	3-	4	4+	5
477	Ontario	0	1+	2	2+	4	4+	5

1/Evaluation scale: 0 = No blight; 2 = less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation, 5 = plants dead from late blight.

*Speckle leaf moderate to severe, difficult to determine extent of injury resulting from blight.

West Virginia Table 2. Influence of spray intervals and disease index and yield of three potato varieties with varying degrees and types of resistance to P. infestans.

										Yield ^{2/}	Percent
											Reduction
										Cwt/A	
										9/5	9/12
										8/21	8/29
										Defoliation ^{1/}	
										8/15	8/9
										Spray	Intervals
										Abnaki	
7 sprays	7 day	2+	2+	3-	2+	1+	1+	216.3 (a)	-		
4 sprays	14 day	2	3-	2+	4	4	5	134.2 (b)	38.0		
3 sprays	21 day	2+	3-	3-	3+	4	5	100.3 (b)	53.7		
2 sprays	28 day	2	3	2+	4	4+	5	75.5 (b)	65.2		
0 sprays ^{3/}	-	3	4+	5	5	5	5	-	-		
										BR5991-WV16	
7 sprays	7 day	0	0	0	0	1-	1-	326.3 (c)	-		
4 sprays	14 day	0	1-	1-	1-	1-	1+	303.7 (c)	6.94		
3 sprays	21 day	0	0	1-	1-	1-	2-	295.0 (c)	9.59		
2 sprays	28 day	0	1-	1	2-	2-	2	313.0 (c)	4.10		
0 sprays ^{3/}	-	1-	2	2+	3-	4-	5	-	-		
										B6026-WV5	
7 sprays	7 day	0	0	0	0	1-	0	176.9 (d)	-		
4 sprays	14 day	0	0	1-	1-	1-	1-	178.1 (d)	-		
3 sprays	21 day	0	0	1-	0	0	1	184.4 (d)	-		
2 sprays	28 day	0	1-	0	1+	1-	1	164.6 (d)	6.9		
0 sprays ^{3/}	-	1-	1+	2	3	3+	4+	-	-		

^{1/}Evaluation Scale: 0 = No blight; 1 = trace; 2 = Less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation; 5 = plants dead.

^{2/}Yield expressed as hundred weight per acre (Cwt/A) and percent reduction.

^{3/}Readings taken from seedling late blight test located approximately 50' from the integrated control plot. Treatments sharing the same letter are not significantly different.

Reedsville Yield Test 1974. The field plots were hand planted into preformed rows on May 20, 1974. Fertilizer (12-12-24) and disyston (15% granular) were incorporated according to soil analyses and manufacture recommendations. One half the fertilizer was broadcast and plowed down, the remainder was applied to rows immediately prior to planting. There were three yield tests in 1974, one large test consisting of 10 entries with six replications and two smaller preliminary tests consisting of 15 entries each with three replications. Each replication was comprised of 30 hills planted into 25' of row, equivalent to 0.0017 acres. Potato vines were killed on September 26 and tubers harvested on October 3. Late blight was a problem late in the season. An extended period of cool weather accompanied by abundant rainfall interfered with normal spraying activities, as a result some tuber infection occurred. The results of these tests are given in West Virginia Tables 3, 4, and 5. Additional information is provided in terms of foliage blight infection (Huttonsville data) and tuber characteristics.

Evaluation of selected components of the disease cycle of *Phytophthora infestans* (Mont.) de Bary in the expression of multigenic resistance to potato late blight. The mechanisms of multigenic resistance are thought to be controlled by physiological, morphological and environmental factors. These biological factors modified by the environment combine to slow the natural cycling of the pathogen at each step in the disease cycle. Three parameters of the disease cycle were selected for examination in field plots to determine their possible role and importance in the expression of multigenic resistance.

Four varieties with varying degrees of monogenic and multigenic resistance were grown in a replicated field plot without benefit of protective fungicides. Susceptible varieties were planted in "inoculator rows" and inoculated with a virulent race of *Phytophthora infestans* (race-1,2,3,4). This technique allows the pathogen to cycle and spread naturally to the test varieties. Weekly examinations indicated that exposure periods prior to lesion development were significantly longer in varieties exhibiting higher levels of multigenic resistance. Further, the areas of the sporulating annulus was significantly smaller in resistant varieties and therefore, fewer total sporangia were produced. No differences were found in spore densities, zoospore release, infectivity, or rate of invasion. This data is presented in West Virginia Table 6.

The Expanding Host Range of *Cristulariella pyramidalis* (Waterman and Marshall). Until 1973, when Baniecki and Young (1) reported *C. pyramidalis* on Lima bean (Fordhook) and garden bean (Harvester) this foliar pathogen had been reported exclusively on woody species. In 1974, *C. pyramidalis* was found again on Lima and garden beans and on numerous woody species i.e., maple, sassafras, and ash. In addition to the above hosts, this fungus was found on two previously unreported hosts, the potato *Solanum tuberosum* L. and *Convolvulus sepium* L. the common hedge bind weed. Symptoms on the potato haulm are characterized by spindle shaped lesions (1.0-2.0 cm x 0.5 cm) with a whitish center blending outwardly into a light shade of grey. This central portion of the lesion is surrounded by a broad, dark diffuse margin.

Numerous lesions were observed which appeared to be causing severe stress to the plant in the form of necrosis of the haulm. Isolations made from these lesions yielded *C. pyramidalis*. Cultural characteristics of these isolates appeared to be the same as those isolates obtained from Lima bean, maple and sassafras.

West Virginia Table 3. Yield, blight reading and tuber characteristics of 10 varieties grown at Reedsville, West Virginia.

Pedigree	Yield ¹ / over 2.5"	Percent blighted tubers	Foliage blight readings ² / tubers	Tuber characteristic ³ / tubers	
B6086-WV21	376.9 a	85.8	0.0	2+	3+* (wh)
BR5991-WV13	329.9 ab	84.9	0.0	3	3+ (wh)
B6935-WV2	306.7 abc	83.4	1.37	3+	3 (wh)
B6039-WV6	300.9 abc	78.75	0.0	2-	3+-4 (wh)
B6949-WV6	299.4 abc	84.04	6.76	3+	3+-4 (wh)
Kennebec	283.9 bc	80.73	7.08	4	3-3+ (wh)
B6928-WV2	281.5 bc	78.01	4.65	3-	3-3+ (wh)
B6981-WV4	280.04 bc	78.45	9.71	3-	3-3+ (wh)
Alamo	248.1 bc	75.15	11.99	5	3+-4 (wh)
B6039-WV9	240.8 c	75.55	8.99	3+	3+ (wh)

¹Yield in cwt/A of U.S. No. 1 potatoes; lines sharing a common letter are not statistically different.

²Foliage late blight evaluation, Huttonsville 8/21/74; 0 = no blight; 1 = trace; 2 = less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation; 5 = plants dead from late blight.

³Tuber characteristic: 1 = poor type; 5 = excellent type; wh = white.

West Virginia Table 4. Yield blight readings and tuber characteristics of 15 West Virginia selections, grown at Reedsville, West Virginia.

Pedigree	Yield		U.S. No. 1	Percent Total Yield	Blighted tubers	Foliage blight ³ /	Tuber characteristic ⁴ /
	Total Pounds ¹ /	Cwt/A U.S. No. 1 ² /					
B6988-WV6	176.0 a	341.1	73.03		1.24	3	3+-4 (wh)
B6981-WV3	156.5 ab	303.3	75.6		5.8	4+	3-3+ (wh)
B6988-WV1	151.0 abc	292.6	65.2		2.38	3	3+ (wh)
B6988-WV4	148.5 abc	287.8	69.6		1.64	3-	3-3+ (wh)
B6992A-WV2	146.0 abc	282.9	88.2		3.3	5-	3 (wh)
B5090-11	145.0 abc	280.99	71.25		2.70	3	3-3+ (wh)
B6981-WV1	142.5 abc	276.2	69.9		1.59	2	3+-4 (wh)
B7019-WV1	131.0 abc	253.9	87.3		1.67	3+	4-4+ (wh)
B6928-WV6	122.0 bc	236.4	59.15		23.5	4+	3-3+ (wh)
B6949-WV7	120.0 bc	232.6	75.7		3.8	5	3 (wh)
B6992A-WV3	119.5 bc	231.6	62.9		22.7	5-	3+ (wh)
B6981-WV2	116.5 bc	225.8	76.9		4.95	5	
B7019-WV2	107.5 bc	208.33	75.7		4.58	5-	3-3+ (wh)
B6994-WV1	106.0 bc	205.4	78.8		5.22	5-	3+ (wh)
B6992A-WV6	101.5 c	196.7	87.1		2.57	4+	3+-4 (wh)

¹Total yield in pounds of U.S. No. 1 potatoes from 3 replications. Lines sharing a common letter are not statistically different.

²Yield converted to cwt/A of U.S. No. 1 potatoes, average of three replications.

³Foliage late blight evaluations, Huttonsville 8/21/74: 0 = No blight; 1 = trace blight; 2 = less than 10% defoliation; 4 = 25% defoliation; 5 = plants dead.

⁴Tuber characteristics: 1 = poor type; 5 = excellent type; wh = white.

West Virginia Table 5. Yield, blight readings and tuber characteristic of 15 USDA selections, grown at Reedsville, West Virginia.

Pedigree	Yield		Percent U.S. No. 1	Percent Blighted tubers	Foliage blight readings ^{3/}	Tuber Characteristic ^{4/}
	Total Pounds ^{1/}	Cwt/A ^{2/}				
B6761-11	169.0 a	327.5	75.8	4.3	2-	3+-4 (wh)
B6782-1	149.0 a	288.8	83.7	2.81	4+	3+-4 (wh)
B6139-11	145.0 ab	282.0	85.3	0.0	3+	3+-4 (wh)
BR6446-2	134.0 ab	259.7	77.8	4.1	4+	3+ (wh)
B6265-1	134.0 ab	259.7	72.63	5.7	4+	3+-4 (wh)
B6463-2	128.5 ab	249.0	72.5	0.14	4+	3+ (wh)
B6705-10	127.5 ab	247.1	78.2	13.8	4	3+ (wh)
B5422-9	126.0 ab	244.2	86.0	0.0	3+	3+ (wh)
Targhee	126.0 ab	244.2	67.4	2.7	-	3- (Russ)
B6815-14	124.0 ab	240.3	65.3	6.04	2+	3+ Red
Abnaki	123.5 ab	239.5	73.96	10.8	5	3+-4 (wh)
B6761-12	117.0 ab	226.7	65.4	0.0	2	3 (wh)
B6097-9	111.5 abc	216.3	85.7	3.8	3+	3+-4 (wh)
CA03-2	84.0 bc	162.8	77.1	9.2	-	4+ (wh)
BR6879-5	52.0 c	100.8	63.6	0.0	5	3+ (wh)

^{1/}Total yields in pounds of U.S. No. 1 potatoes from 3 replications. Lines sharing a common letter are not statistically different.

^{2/}Yield as cwt/A, U.S. No. 1, average of 3 replications.

^{3/}Foliage late blight evaluation, Huttonsville 8/21/74: 0 = no blight; 1 = trace blight; 2 = less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation; 5 = plants dead.

^{4/}Tuber characteristic: 1 = poor type; 5 = excellent type; (wh) = white; Russ = russet.

West Virginia Table 6. Components of multigenic resistance in selected clones.

Clone	Lesion ¹ / area in (CM) ²	Width of sporulating ² / annulus in mm	Sporangia ³ / density 1 x 10 ²	No. of ⁴ / sporangia 1 x 10 ²	Yield ⁵ / 100	Field ⁶ / Index
Sebago	3.22	4.28	3.17	5.18	10.25	4+
B6086-WV21	2.66	2.30	3.11	2.25	8.89	3
B6935-WV2	2.24	2.31	3.32	2.38	10.01	4
B6026-WV5	3.02	1.18	2.56	0.82	4.84	2
LSD .01	1.30	0.85	1.52	2.86		

¹/Mean of the readings.

²/Mean of the readings.

³/Mean of the readings, number of sporangia on 0.93 cm² of the sporulating annulus.

⁴/Mean of the readings, number of sporangia calculated to be produced on sporulating annulus.

⁵/Mean of 4 replications, yield given in pounds of U.S. No. 1 tubers per 18 hills.

⁶/Disease reading, mean of 4 replications of 10 plants each, taken on 9/5/74. Rating based on a scale of 0 to 5, 0 = no blight; 5 = plant dead.

The importance of these findings is yet to be determined. Symptoms appeared late in the growing season during periods of abundant rainfall and cool temperatures.

The extent of damage to the haulms was quite severe which could seriously affect yields should the disease become epiphytotic. The disease, as it occurs on maple, has become epiphytotic causing severe premature defoliation of affected trees.

1. Baniecki, J. F. and R. J. Young. 1974. New hosts of Cristulariella pyramidalis. Plant Disease Reporter 58: 421-423.

